2miy

CR 114694

(NASA-CR-114694) MARCH 1971 WIND TUNNEL TESTS OF THE DORAND DH 2011 JET FLAP MOTOR, VOLUME 2 Final Report (Giravions Dorand Co., Suresnes (France)) ~~151~~ 153 p HC $9.75 CSCL 01C G3/02

N74-13723

Unclas

26165

GIRAVIONS DORAND

March 1971 Wind Tunnel Tests of the Dorand DH 2011 Jet Flap Rotor

Final Report

Document DH 2011-D E5 Volume II

June 1973

Contract N° NAS2 - 3673
Modification N° 15 Task C

Prepared by :

Marcel KRETZ
Chief Engineer

Jean-Noël AUBRUN
Research Engineer

Marc LARCHE
Research Engineer

The work reported in this document has been made possible through support and sponsorship of the United States Government through its National Aeronautics and Space Administration, Ames Research Center, in joint participation with U. S. Army Air Mobility Laboratory.

GIRAVIONS DORAND

5, Rue Jean Macé - 92153 SURESNES
FRANCE

Tél. : 772-18-20

March 1971 Wind Tunnel Tests

of the Dorand DH 2011 Jet Flap Rotor

Final Report

VOLUME II

TABLE OF CONTENTS

Page

$\theta_{0.7} = 5°$

CAM $\varphi =$

DH.2011 D . JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUNS: 1.2.3
March 12, 1971

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_S	α_P	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	1.1	150	~ 0	-5	+3	34	0	0	0	15	95	96	0,6	0
2	2.1	200	-50	-5	+2	34	0	0	0	17	134	120	1,1	0
3	2.2	250	-100	-5	+1,7	34	0	0	0	18	185	160	1,73	0
4	2.3	300	-150	-5	+1,2	34	0	0	0	20	205	200	2,50	0
5	2.4	290	-50 -100	-5	0	34	20	0	0		190	200	2,50	0
6														
7	3.1	150	-25	0	+1,5	34	0	20	0	15 ± 10	85	95	0,6	0
8	3.2	200	-75	0	+1,5	34	0	20	0	15 ± 8	118	125	1,10	0
9	3.3	250	-125	0	+1,3	34	0	20	0	15 ± 6	150	163	1,80	0
10	3.4	285	-175	0		34	0	20	0	15 ± 6	175	200	2,45	0
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														

GIRAVIONS DORAND

TABLE I.1

DH.2011 D-E5

1

$\theta_{0.7} = 5°$

CAM $\varphi = -60°$

DH 2011 D - JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 4
March 15 1971

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_s	α_p	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	p_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	4.1	Calibration												
2														
3	4.2	200	1820	-5	2	26	0	0	0	10	120	105	0,85	0
4	4.3	250	2700	-5	1,6	26	0	0	0	10	160	138	1,29	0
5	4.4	288	3800	-5	1,2	26	0	0	0	10	195	170	1,8	0
6	4.5	200	2100	-5	1,9	35	0	0	0	15	125	125	0,95	0
7	4.6	250	3400	-5	1,4	35	0	0	0	15	182	160	1,65	0
8	4.7	280	4300	-5	1,2	35	0	0	0	15	220	185	2,05	0
9	4.8	200	2600	-5	1,5	42	0	0	0	20	145	142	1,25	0
10	4.9	250	4250	-5	1,2	42	0	0	0	20	218	188	2,10	0
11	4.10	275	4950	-5	1,1	42	0	0	0	20	256	200	2,40	0
12	4.11	200	3650	-5	1,2	51	0	0	0	25	198	176	1,95	0
13	4.12	240	4800	-5	1,1	51	0	0	0	25	254	200	2,50	0
14	4.13	Impossible												
15	4.14	193	3900	-5		57	0	0	0	30	215	195	2,15	0
16	4.15													
17	4.16													
18	4.17													
19	4.18													
20	4.19													
21	4.20	Not run		-5		26				~ 10°				
22	4.21													

GIRAVIONS DORAND

TABLE I-2

Doc DH 2011 D.ES

$\theta_{0.7} = 5°$

CAM I $\varphi = -60°$

DH.2011D JET FLAP ROTOR

MARCH 71 WIND TUNNEL TESTS

RUN 6

March 16, 1971

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_s	α_p	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	6.1		Calibration											
2	6.2	288	4000	-12	-2,0	40	0	36	0	5-15	221	167	2.0	88
3	6.3	288	4500	-12	-1	32	0	-27	0		253	182	2.3	88
4	6.4	294	4100	-10	-2,3	40	0	32	0	5-22	210	164	1.85	88
5	6.5	290	3700	-10	-1,28	24	0	-29	0	5-15	220	160	1,80	88
6	6.6	288	4000	-8	-2,5	20	0	-27	0	3-12	192	155	1.60	88
7	6.7	288	4150	-6	-3	18	0	-28	0		175	142	1,40	88
8	6.8	275	5000	-8	-3	45	0	0	0	3-9	255	190	2,4	88
9	6.9	270	6000	-6	-2,5	40	0	-29	0		254	190	2.35	88
10	6.10	265	5900	-6	-2,5	40	0	-29	20		250	192	2.35	88
11	6.11	260	5900	-6	-2,5	40	0	-29	40	±2	250	192	2.35	88
12	6.12	255	5700	-6	-2,5	40	0	-29	60		252	193	2.35	88
13	6.13	290	6700	-6	-3,2	40	0	0	40		255	192	2.32	88
14														
15														
16														
17														
18														
19														
20														
21														
22														

GIRAVIONS DORAND

TABLE I.3

Page 3

Doc' DH 2011D. ES

$\theta_{0.7}$ 5°

CAM I $\varphi = 0$

DH.2011 D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUNS: 7 - 8
March 17, 1971

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	R.P.M	T	α_s	α_p	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
		lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
7.1	Calibration												
7.2	288	6200	-6	-2,6	34	0	-28	0	12-20	252	184	2,3	87
7.3	284	6250	-6	-2,7	34	0	-28	20	15-25	250	184	2,3	87
7.4	280	6000	-6	-2,6	34	0	-28	40	12-32	250	185	2,3	87
7.5	275	5700	-6	-2,3	34	0	-28	60	10.40	258	190	2,38	87
7.6	235	5400	-10	-2,8	55	0	0	0	33	262	200	2,55	76
7.7	230	5250	-10	-2,8	55	0	0	20	33	262	200	2,55	76
7.8	230	5200	-10	-2,8	55	0	0	40	30.40	260	200	2,55	76
7.9	230	5200	-10	-2,8	55	0	0	60	25.40	260	200	2,55	76
7.10	225	5600	-8	-2,6	55	0	-22	0	28.30	260	200	2,55	76
8.1	Calibration												
8.2	260	5800	-8	-2,6	44	0	0	0	25	250	180	2,35	76
8.3	250	5600	-8	-1,4	44	0	-38	0	12.38	282	195	2,60	76
8.4	255	6000	-6	-2	44	0	-40	0	10.40	280	195	2,60	76
8.5	250	6000	-6	-2	44	0	-40	20	15.40	280	195	2,60	76
8.6	245	6200	-6	-2	44	0	-40	40	18.42	276	196	2,60	76
8.7					44	0	-40	60					

GIRAVIONS DORAND

TABLE I.4

Page 4

Doc DH 2011D. E5

$\theta_{0.7} = 5°$

CAM I $\varphi = 0$

DH.2011D. JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 9
March 18, 1971

GIRAVIONS DORAND

TABLE I.5

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_S	α_P	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	p_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	9.1	250	4000	-10	-2,6	44	0	28	0	20.38	250	180	2,31	123
2	9.2	250	4100	-10	-2,6	44	0	28	0	15.35	250	180	2,31	123
3	9.3	245	4300	-10	-2,7	44	0	28	20	20.40	250	180	2,31	123
4	9.4	250	4100	-10	-2,7	40	0	28	40	18.38	242	180	2,30	123
5	9.5	250	3900	-10	-2,5	40	0	28	60	11.45	245	180	2,30	123
6	9.6	250	4000	-12	-2,6	48	0	28	0	20.35	270	196	2,55	123
7	9.7	240	4000	-12	-2,6	48	0	28	20	24.38	270	198	2,60	123
8	9.8	240	3900	-12	-2,6	48	0	28	40	22.42	265	200	2,55	123
9	9.10	240	3600	-12	-2,6	48	0	28	60	20.50	265	200	2,55	123
10	9.11	250	4000	-12	-3	47	0	28	0	26.39	250	192	2,40	123
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														

Doc. DH.2011D E5

$\theta_{0.7} = 5°$

CAM IV, $\varphi = -55°$

DH. 2011 D . JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUNS: 10 - 11
March 19, 1971

GIRAVIONS DORAND

TABLE 1.6

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_s	α_p	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	10.1	Calibration												
2	10.2	250	6100	-6	-2,6	45	0	18	14	28.32	250	192	2,42	77
3	10.3	250	6000	-6	-2,6	45	0	18	20	28.33	250	192	2,42	77
4	10.4	250	6000	-6	-2,4	45	0	18	40	24.40	258	200	2,50	77
5	10.5	248	5750	-6	-2	45	0	18	60	18.45	254	200	2,45	77
6	10.6	245	5400	-6	-1,8	45	0	18	80	10.52	252	200	2,45	123
7	10.7	250	4000	-10	-2,5	41	0	28	14	20.35	240	195	2,25	123
8	10.8	250	4000	-10	-2,5	41	0	28	40	20.40	240	195	2,25	123
9	10.9	250	3750	-10	-2,3	41	0	28	60	15.55	240	195	2,25	123
10	10.10	250	3500	-10	-2,2	41	0	28	80	10.55	240	195	2,25	123
11														
12	11.1	Calibration												
13	11.2	195	3000	-10	-2,6	50	0	20	14	20.40	190	163	1,80	122
14	11.3	200	2900	-10	-2,6	50	0	20	40	20.48	190	163	1,80	122
15	11.4	195	2800	-10	-2,6	50	0	20	60	20.55	185	163	1,80	122
16	11.5	200	2900	-10	-2,6	50	0	20	75	18-6	198	170	1,85	122
17	11.6	200	2900	-10	-2,6	50	0	20	14	20.40	195	170	1,85	122
18	11.7	200	3000	-8	-2,6	45	0	34	14	10.40	165	155	1,5	122
19	11.8	200	3000	-8	-2,6	47	0	34	40	14.50	168	155	1,5	122
20	11.9	200	3000	-8	-2,6	48	0	31	60	15.55	172	157	1,55	122
21	11.10	200	3000	7	-2,8	46	0	32	14	15.42	155	145	1,30	122
22	11.11	200	3000	7	-2,8	46	0	32	40	12.48	155	145	1,30	122
23	11.12	200	2900	7	-2,8	46	0	32	60	12.52	155	145	1,30	122

Doc DH.2011D. E5

$\theta_{0.7} = 5°$

CAM IV - φ = - 95°

DH. 2011 D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 12
March 19, 1971

GIRAVIONS DORAND

TABLE I.7

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_S	α_P	$\bar{A}_o$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	12.1	Calibration												
2	12.2	250	6000	- 6	- 2,5	43	0	20	14	22.30	240	175	2,2	76
3	12.3	250	5900	- 6	- 2,2	43	0	20	40	18.40	250	182	2,35	76
4	12.4	250	5900	- 6	- 1,6	44	0	20	60	15.45	255	190	2,45	76
5	12.5	250	5750	- 6	- 1,5	46	0	20	75	10.50	255	190	2,45	76
6	12.6	245	5000	- 10	- 2	44	0	20	14	22.30	245	185	2,35	76
7	12.7	250	5000	- 10	- 1,2	44	0	20	40	20.40	260	192	2,50	76
8	12.8	250	4900	- 10	- 0,8	44	0	20	60	13.45	260	192	2,50	76
9	12.9	250	4900	- 10	- 0,5	44	0	20	75	10.47	260	192	2,50	76
10	12.10	250	4000	- 10	- 2,6	40	0	24	14	20.29	230	180	2,1	122
11	12.11	255	4000	- 10	- 2,6	40	0	24	40	15.38	245	185	2,25	122
12	12.12	250	3900	- 10	- 2,3	43	0	24	60	12.48	252	192	2,35	122
13	12.13	250	3900	- 10	- 2,2	43	0	24	75	10.51	252	192	2,35	122
14	12.14	250	3500	- 12	- 2,6	40	0	24	14	20.30	230	180	2,1	122
15	12.15	250	3550	- 12	- 2,3	43	0	24	40	20.40	250	190	2,3	122
16	12.16	245	3400	- 12	- 2,0	44	0	24	60	13.48	250	190	2,3	122
17	12.17	250	3500	- 12	- 1,9	44	0	24	75	10.50	258	195	2,4	122
18	12.18	245	2800	- 15	- 2,2	44	0	28	14	23.32	230	190	2,2	122
19	12.19	245	2900	- 15	- 1,6	47	0	28	40	20.45	250	195	2,4	122
20	12.20	245	2700	- 15	- 1,0	47	0	28	60	15.52	250	195	2,4	122
21	12.21	250	2600	- 15	- 0,9	47	0	28	75	10.55	250	195	2,4	122
22														

Page 7

Doc. DH.2011D. E5

$\theta_{0.7} = 5°$

CAM IV $\varphi = 0$

DH.2011 D . JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN - 13
March 22, 1971

GIRAVIONS DORAND

TABLE I.8

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	R.P.M	T	α_S	α_P	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
		lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
13.1	Calibration												
13.2	245	5900	-6	-2,5	45	0	20	14	22.30	245	175	2,3	76
13.3	245	5900	-6	-2,3	45	0	20	40	12.35	252	182	2,35	76
13.4	250	6000	-6	-2	45	0	20	60	6.41	265	188	2,48	76
13.5	250	6000	-6	-2	45	0	20	75	3.45	265	188	2,48	76
13.6	250	5000	-10	-2	42	0	20	14	21.28	255	185	2,40	76
13.7	245	4900	-10	-1,6	42	0	20	40	10.33	257	187	2,42	76
13.8	250	4900	-10	-1,2	42	0	20	60	3.40	265	190	2,50	76
13.9	250	5000	-10	-1,2	42	0	20	75	0.42	265	190	2,50	76
13.10	250	4000	-10	-2,6	41	0	25	14	21.29	240	180	2,2	122
13.11	250	4000	-10	-2,6	41	0	25	40	10.35	245	185	2,3	122
13.12	250	3950	-10	-2,6	41	0	25	60	5.40	245	185	2,3	122
13.13	250	3850	-10	-2,6	41	0	25	75	0.45	245	185	2,3	122
13.14	250	3000	-15	-2,2	46	0	25	14	23.32	252	190	2,37	122
13.15	250	2900	-15	-1,8	46	0	25	40	12.40	260	195	2,45	122
13.16	250	2750	-15	-1,7	46	0	25	60	7.43	260	195	2,45	122
13.17	250	2600	-15	-1,7	46	0	25	75	3.48	255	195	2,42	122

Doc DH 2011D-E5

$\theta_{0.7} = 5°$

CAM IV $\varphi = 105°$

DH.2011D - JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 14
March 22, 1971

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	R.P.M	T	α_s	α_p	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	p_1	V
		lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
14.1	Calibration												
14.2	250	6100	-6	-2,5	48	0	20	14	16.31	250	185	2,35	76
14.3	250	6000	-6	-2,3	48	0	20	40	20.39	253	190	2,45	76
14.4	248	6000	-6	-2,2	48	0	20	60	15.41	260	195	2,48	76
14.5	250	6000	-6	-2,2	48	0	20	75	10.41	260	195	2,48	76
14.6	250	5000	-10	-2,2	45	0	20	14	25.29	250	193	2,40	76
14.7	250	5000	-10	-1,6	45	0	20	40	20.35	257	197	2,48	76
14.8	250	4900	-10	-1,3	45	0	20	60	11.36	255	198	2,50	76
14.9	250	4900	-10	-1,2	45	0	20	75	8.39	255	198	2,50	76
14.10	250	4000	-10	-2,6	44	0	26	14	24.32	240	190	2,28	~120
14.11	250	4000	-10	-2,5	44	0	26	40	18.37	242	192	2,30	120
14.12	250	4000	-10	-2,4	44	0	26	60	11.39	248	197	2,38	120
14.13	250	3950	-10	-2,4	44	0	26	75	8.40	248	197	2,38	120
14.14	252	3000	-15	-2,2	44	0	26	14	25.30	240	192	2,28	120
14.15	249	3000	-15	-1,8	47	0	26	40	20.40	255	204	2,48	120
14.16	247	3000	-15	-1,7	47	0	26	60	15.42	255	204	2,48	120
14.17	245	2900	-15	-1,7	47	0	26	75	10.42	255	204	2,48	120

GIRAVIONS DORAND

TABLE I.9

$\theta_{0.7} = 5°$

CAM IV $\varphi = 45°$

DH. 2011 D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUNS 15-16
March 22, 1971

GIRAVIONS DORAND

TABLE I.10

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	R.P.M	T	α_s	α_p	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	p_1	V
		lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
15.1	Calibration												
15.2	254	6000	-6,2	-2,2	25			17		230	168	2,13	74
		δ brouillé (collecteur tournant à nettoyer) signal δ coupé											
16.1	Calibration												
16.2	250	6000	-6,0		48	0	20	17	25.34	240	175	2,30	74
16.3	252	6000	-6,0	-2,2	48	0	20	40	20.35	250	185	2,40	74
16.4	252	6000	-6,0	-2,0	45	0	20	60	10.38	257	190	2,52	73
16.5	252	5000	-10	-2,0	55	0	30	17	25.30	242	182	2,30	73
16.6	252	4900	-10	-2	46	0	0	40	22.30	242	185	2,30	73
16.7	252	4950	-10	-2	46	0	0	60	20.37	250	188	2,40	73
16.8	252	4000	-10	-2,5	44	0	0	17	25.29	222	172	2,03	117
16.9	250	4000	-10	-2,5	44	0	0	40	22.32	225	172	2,07	117
16.10	250	4000	-10	-2,5	44	0	0	60	18.36	220	170	2,10	117
16.11	250	3000	-10	-2,5	49	0	0	17	28.30	238	185	2,25	117
16.12	252	3000	-10	-2,5	49	0	0	40	25.35	247	192	2,35	117
16.13	252	3000	-10	-2,0	53	0	0	60	22.40	232	185	2,18	117

δ 16/10 : V_1 drop high
δ_γ high

Pag 10

DH.2011 D. E5

$\theta_{0.7} = 5°$

CAM V, $\varphi = 60°$

DH.2011D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 17
March 23, 1971

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	R.P.M	T	α_S	α_P	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
		lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
17.1 Calibration													
17.2	252	6000	-6	-2	46	0	20	17	25.30	243	172	2,30	74
17.3	252	6000	-6	-2	46	0	20	20	25.30	243	173	2,30	74
17.4	252	6000	-6	-2	46	0	20	40	22.32	248	176	2,37	74
17.5	252	6000	-6	-2	45	0	20	60	22.36	253	182	2,42	74
17.6	250	5000	-10	-2	41	0	20	14	23.26	243	176	2,32	74
17.7	250	5000	-10	-2	41	0	20	25	23.28	242	177	2,30	73
17.8	250	5000	-10	-2	42	0	20	40	22.30	250	183	2,40	73
17.9	250	5000	-10	-2	42	0	20	60	20.32	255	186	2,45	73
17.10	250	5000	-10	-2	43	0	20	80	18.33	247	185	2,40	73
17.11	240	4000	-10	-2,5	41	0	20	14	20.35	222	170	2,05	116
17.12	240	4000	-10	-2,5	42	0	20	25	20.30	226	173	2,10	116
17.13	240	4000	-10	-2,5	42	0	20	40	20.30	227	175	2,10	117
17.14	245	4000	-10	-2,5	42	0	20	60	20.35	235	180	2,20	117
17.15	245	4000	-10	-2,5	42	0	20	80	18.35	237	180	2,20	117
17.16	252	3000	-15	-2,5	47	0	20	14	25.30	250	180	2,40	117
17.17	250	3000	-15	-2,5	47	0	20	25	25.32	248	190	2,39	116
17.18	250	3000	-15	-2,5	47	0	20	40	24.32	250	190	2,40	117
17.19	250	3000	-15	-2,5	48	0	20	60	20.32	250	190	2,40	117

17.5 σ_β increases $\rightarrow \approx \pm 8$ hb (Channel 4-2/2) - 17-8 V_i decreases - 17/10 σ_β increases

17.13 : Cam has no noticeable effect. 17-19 : cam has no noticeable effect

GIRAVIONS DORAND

TABLE I.11

Doc DH2011D.E5

5°

V 90°

DH.2011D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TEST

RUN 18
March 24, 1971

	2	3	4	5	6	7	8	9	10	11	12	13	14
	RPM	T	α_S	α_P	$\bar{A}_o$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
		lb	deg	deg	%	%	%	%	deg	mbar	deg C	bar	kts
18.1	Calibration												
18.2	253	6000	-6	-2,2	44	0	20	14	25.29	230	165	2,15	77
18.3	251	6000	-6	-2,2	44	0	20	25	25.30	238	170	2,25	77
18.4	251	6000	-6	-2,2	44	0	20	40	25.30	240	173	2,29	77
18.5	250	6000	-6	-2,2	44	0	20	60	24.31	240	173	2,29	77
18.6	252	5000	-10	-1,8	42	0	20	14	25.27	250	180	2,40	77
18.7	250	5000	-10	-1,8	42	0	20	25	25.27	248	180	2,35	77
18.8	249	4950	-10	-1,8	42	0	20	40	22.28	248	180	2,35	77
18.9	251	5000	-10	-1,5	42	0	20	60	22.28	248	180	2,35	77
18.10	250	4000	-10	-2,4	42	0	20	14	23.26	228	171	2,1	123
18.11	250	4000	-10	-2,4	42	0	20	40	22.27	230	174	2,13	123
18.12	251	3950	-10	-2,4	42	0	20	60	21.38	230	175	2,13	123
18.13	253	3000	-15	-2	47	0	20	14	26.30	250	187	2,35	123
18.14	250	3000	-15	-2	47	0	20	40	26.31	248	187	2,35	123
18.15	250	3000	-15	-1,9	47	0	20	60	26.31	248	187	2,35	123
18.16	250	2950	-15	-1 8	47	0	20	80	24.32	248	187	2,35	123

GIRAVIONS DORAND

TABLE I.12

DH 2011D ES

$\theta_{0.7} = 5°$

CAM V $\varphi = 15°$

DH 2011 D. JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 19
March 24, 1971

GIRAVIONS DORAND

TABLE I.13

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	R.P.M	T	α_S	α_P	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
		lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
19.1	Calibration												
19.2	249	6000	−6	−2	43	0	21	14	25.30	225	170	2,10	76
19.3	246	5950	−6	−2	43	0	21	40	20.30	225	170	2,10	76
19.4	250	6100	−6	−2	43	0	21	60	22.33	232	175	2,20	76
19.5	253	5100	−10	−1,7	39	0	21	14	23.26	232	175	2,20	76
19.6	253	5050	−10	−1,5	39	0	21	40	20.30	234	176	2,20	76
19.7	253	5000	−10	−1,5	39	0	21	60	19.30	234	176	2,20	76
19.8	249	4000	−10	−2,2	39	0	21	14	23.26	210	165	1,92	123
19.9	251	4000	−10	−2,2	39	0	21	40	15.29	215	170	2,0	123
19.10	250	4100	−10	−2,2	44	0	21	60	16.33	228	178	2,12	123
19.11	249	4000	−10	−2,2	44	0	21	80	15.35	228	178	2,12	123
19.12	248	3000	−15	−1,8	45	0	21	14	25.30	222	176	2,05	123

Disappearing of the multicyclic signal → wind turned off.

Page 13

DH 2011D.E5

$\theta_{0.7} = 5°$

CAM IV $\varphi = -55°$

DH. 2011 D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TEST

RUN 20
March 24, 1971

GIRAVIONS DORAND

TABLE 1.14

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_S	α_P	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	20.1	Calibration												
2		δ zero is shifted → B_1 is shifted by 20 %.												
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														

Page 14

Doc DH 2011D. E5

$\theta_{0.7} = 5°$

CAM IV $\varphi = -55°$

DH.2011D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN : 20

March 25, 1971

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_s	α_p	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	20.1 Calibration													
2	20.2	200	2850	-8	-2.5	53	0	20	0	20.36	148	136	1.3	122
3	20.3	198	2850	-8	-2.4	53	0	20	60	21.51	155	145	1.4	122
4	20.4	202	2900	-10	-2.3	57	0	20	0	23.40	184	170	1.75	122
5	20.5	200	2900	-10	-2.2	57	0	20	60	25.53	190	168	1.85	122
6	20.6	200	3000	-12	-2.2	64	0	20	0	32.45	220	183	2.25	122
7	20.7	201	3050	-12	-2.2	64	0	16	60	33.51	230	185	2.35	122
8	20.8	167	2400	-8	-2.5	62	0	28	20	20.55	150	155	1.26	122
9	20.9	169	2500	-8	-3	62	0	24	40	25.55	150	155	1.22	122
10	20.10	166	2000	-10	-2.5	62	0	24	40	24.55	145	145	1.3	122
11	20.11	167	2000	-10	-2.5	62	0	24	0	22.48	145	145	1.3	122
12	20.12	167	1850	-12	-2.3	65	0	24	0	25.50	162	160	1.55	122
13	20.13	167	1850	-12	-2.3	65	0	24	38	26.55	162	160	1.55	122
14	20.14	145	1600	-12	-2.5	70	0	24	0	25.55	150	162	1.35	122
15	20.15	144	1600	-12	-2.5	70	0	24	40	25-55	165	160	1.35	122
16	20.16	142	1100	-10	-2.5	60	0	24	0	20.42	100	105	0.70	122
17	20.17	144	1200	-10	-2.5	60	0	24	40	20.50	100	110	0.70	122
18														
19														
20														
21														
22														

GIRAVIONS DORAND

TABLE I.15

Doc DH 2011D.E5

$\theta_{0.7} = 3°$

CAM IV - $\varphi = -55°$

DH.2011D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 21
March 25, 1971

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	R.P.M	T	α_S	α_P	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	ΔP	T_1	P_1	V
		lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
21.1	Calibration -												
21.2	245	5000	-6	-2	50	0	20	0	25-32	217	163	2,02	73
21.3	250	5000	-6	-2	47	0	20	20	25.34	217	162	2,00	73
21.4	250	5000	-6	-2	49	0	20	40	22.37	222	168	2,08	74
21.5	250	5000	-6	-2	50	0	20	60	20.45	237	170	2,25	74
21.6													

21.5 : V_i markedly reduced

Potentiometer XY to check
α_S actuator stalled at 7°

GIRAVIONS DORAND

TABLE I.16

16

DH.2011D.E5

$\theta_{0.7} = 3°$

CAM IV - $\varphi = -55°$

DH.2011 D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUNS 22.23.24
March 26, 1971

GIRAVIONS DORAND

TABLE I.17

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_s	α_p	$\bar{A}_o$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	22.1	Calibration												
2	22.2	249	4500	-10	-2	55	0	18	0	30	240	180	2,3	76
3	22.3	249	4600	-10	-1,8	55	0	18	20	30-34	254	190	2,46	76
4	22.4	250	4750	-10	-1,6	55	0	18	40	30-40	260	195	2,55	76
5	22.5	250	4500	-10	-1,4	54	0	18	60	25-42	255	195	2,50	76
6	22.6	250	4500	-10	-2	55	0	0	0	30	240	185	2,30	76
7	22.7	250	4600	-10	-1,2	55	0	40	0	25-40	260	196	2,55	76
8		Signal coming from the cam.												
9	23.1	Calibration												
10	23.2	250	4000	-10	-2,5	55	0	21	0	30-40	255	194	2,45	115
11	23.3	245	4000	-10	-2,5	55	0	21	20	30-45	255	196	2,50	115
12	23.4	240	4000	-10	-2,5	57	0	21	40	28-45	255	202	2,50	115
13		At 23.4, δ amplitude is doubled at 60%. (0 to 50°) stopped.												
14	24.1	Calibration												
15	24.2	250	4600	-10	1,0	57	0	0	0	0	245	186	2,35	0
16	24.3	250	4600	-10	0,50	57	20 G	0	0	28.32	255	186	2,3	0
17	24.4	250	4850	-10	2,0	57	0	20	0	30.40	250	195	2,45	0
18	24.5	250	4650	-10	3,8	57	0	30	0	25.42	240	192	2,40	0
19	24.6	250	4750	-10	1,0	57	0	0	40	28.36	243	192	2,40	0
20	24.7	250	4800	-10	1,5	57	0	0	60	25.40	248	190	2,41	0
21	24.8	250	4600	-10	3,5	57	0	20	60	25.50	245	192	2,40	0
22	24.9	250	3900	-10	-2,0	57	0	21	20	30.40	252	196	2,44	115

Page 17 — DH.2011D.E5

$\theta_{0.7}$ = 3°

CAM IV $\varphi = -55°$

DH.2011 D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 24

March 26, 1971

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_s	α_p	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	24.10	250	3800	-10	-2,0	57	0	21	40	28-42	253	198	2,45	115
2	24.11	250	3400	-10	-2,0	50	0	21	60	20.50	240	190	2,30	115
3	24.12	250	4000	-8	-2	51	0	20	20	25-35	220	182	2,08	115
4	24.13	250	3700	-8	-2	51	0	20	60	20-50	225	182	2,10	115
5	24.14	200	2500	-8	-2	51	0	20	20	22.42	155	182	1,38	115
6	24.15	200	3000	-8	-2,2	62	0	20	20	28-48	175	160	1,65	115
7	24.16	200	2900	-8	-2,2	60	0	16	60	29-52	166	155	1,50	115
8	24.17	200	2800	-10	-2,2	65	0	20	20	30.50	200	180	1,98	115
9	24.18	200	2900	-10	-2,0	69	0	9	60	30.52	190	172	1,88	115
10	24.19	200	2700	-12	-2,0	67	0	20	20	35.50	135	192	2,25	115
11	24.20	200	2200	-12	-2,0	65	0	12	60	28-50	193	172	1,87	115
12	24.21	167	1300	-12	-2,0	65	0	12	20	30-42	142	190	1,25	115
13	24.22	167	1250	-12	-2,0	65	0	12	60	25.50	138	185	1,20	115
14	24.23	167	1750	-10	-2,0	65	0	12	20	27.50	145	140	1,28	115
15	24.24	167	1650	-10	-2,0	65	0	12	60	27-52	135	130	1,12	115
16	24.25	167	2000	-8	-2,0	65	0	20	20	28-50	130	130	1,05	115
17	24.26	167	2000	-8	-2,8	65	0	12	60	28-53	122	120	0,95	115
18														
19														
20														
21														
22														

GIRAVIONS DORAND

TABLE I.18

Page 18

Doc DH.2011 D.E5

$\theta_{0.7} = 3°$

CAM IV $\varphi = -40°$

DH.2011 D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 25

March 26, 1971

GIRAVIONS DORAND

TABLE 1.19

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	R.P.M	T	α_S	α_P	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
		lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
25.1	Calibration												
25.2	252	4500	-10	1,8	50	0	20	0	28-35	240	170	2,2	75
25.3	252	4500	-10	1,8	50	0	20	20	28-37	250	180	2,3	75
25.4	252	4500	-10	1,8	50	0	20	40	25.40	250	180	2,4	75
25.5	252	4500	-10	1,8	50	0	20	60	24.42	250	180	2,4	75
25.6	252	4500	-6	1,8	45	0	20	0	22-28	190	150	1,7	75
25.7	252	4500	-6	18	44	0	20	20	20-30	200	150	1,7	75
25.8	252	4500	-6	1,8	44	0	20	40	20.33	200	150	1,8	75
25 9	252	4500	-6	1,8	44	0	20	60	29.40	210	160	1,9	75
25.10	252	4000	-10		58	0	20	0	34-36	260	190	2,5	120

25.10 : Air nose clamp broken below the flowmeter
Rollar ball-bearing of the multicyclic cam is damaged

Doc DH.2011D.E5

$\theta_{C.7} = 3°$

CAME IV $\varphi = -40°$

DH.2011D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 26
March 29.1971

GIRAVIONS DORAND

TABLE I. 20

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_S	α_P	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	26.1	Calibration												
2	26.2	251	4000	-10	2.2	60	0	20	0	30.42	263	210	2.60	117
3	26.3	251	4000	-10	2.2	60	0	20	40	28.48	265	210	2.60	117
4	26.4	251	4000	-10	2.2	60	0	10	60	25.50	265	210	2.60	117
5	26.5	245	4000	-10	2.2	60	0	10	75	20.52	262	212	2.60	117
6	26.6	240	4000	-8	2.2	60	0	20	0	28.35	218	188	2.05	117
7	26.7	240	4000	-8	2.2	60	0	20	40	25-29	190	180	1.8	117

20 26.6: δ Signal saw tooth like

Page 20

Doc. DH.2011D.ES

$\theta_{0.7} = 3°$

CAM IV $\varphi = -30°$

DH.2011D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 27
March 29, 1971

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_S	α_p	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	27.1	Calibration												
2	27.2	250	4500	-10	-2	54	0	20	0	30-38	240	200	2.4	72
3	27.3	250	4500	-10	-2	54	0	20	20	28-38	240	200	2.4	72
4	27.4	250	4500	-10	-2	54	0	20	40	25-42	250	210	2.5	72
5	27.5	250	4500	-10	-2	56	0	20	60	20-43	250	210	2.5	72
6	27.6	250	4500	-6	-2		0	20					1.90	72
7	27.7	250	4600	-6	-2	45	0	20	0	25.28	193	185	1.78	72
8	27.8	250		-6	-2	45	0	20	20	24-31	193	185	1,8	72
9	27.9	250	4600	-6	-2	45	0	20	40	20-35	200	190	1.85	72
10	27.10	250	4600	-6	-2	45	0	20	60		200	190	1.84	72
11	27.11	250	4000	-10	-2	58	0	20	0	32.38	245	216	2.38	117
12	27.12	245	3900	-10	-2	58	0	20	40	28.42	250	220	2.45	117
13	27.13	246	3900	-10	-2	58	0	20	60	25.45	245	222	2.44	117
14	27.14	245	3800	-10	-2	58	0	15	75	20-50	245	222	2.44	117
15	27.15	250	4000	-8	-2	56	0	16	0	30-53	220	205	2.05	117
16	27.16	250	4100	-8	-2	55	0	20	40	25.40	235	220	2.20	117
17	27.17	253	4000	-8	-2	55	0	15	60	25.45	225	208	2.15	117
18	27.18	247	4000	-8	-2	55	0	15	75	22.50	225	208	2.15	116
19														
20														
21														
22														

GIRAVIONS DORAND

TABLE I-21

$\theta_{0.7} = 3°$

CAM III $\varphi = 0$

DH 2011 D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 28
March 29, 1971

GIRAVIONS DORAND

TABLE I.22

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	R.P.M	T	α_s	α_p	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
		lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
28.1	Calibration												
28.2	253	5100	-6	-1,8	52	0	22	0	30.33	210	195	2,0	77
28.3	252	5100	-6	-1,8	52	0	22	20	30.33	210	192	2,0	77
28.4	253	5100	-6	-1,8	52	0	22	40	29.34	215	196	2,0	77
28.5	253	5000	-6	-1,8	52	0	22	60	25.34	215	196	2,03	77
28.6	252	4100	-8	-1,8	47	0	22	0	25.30	198	186	1,82	77
28.7	252	4000	-8	-1,8	45	0	22	20	24.29	192	184	1,78	77
28.8	253	4000	-8	-18	45	0	22	40	21.29	194	184	1,75	77
28.9	256	4100	-8	-18	45	0	22	60	21.30	202	190	1,90	77
28.10	252	4200	-10	-1,7	50	0	22	0	28.30	215	200	2,05	77
28.11	252	4000	-10	-1,7	48	0	22	20	29.31	210	196	2,0	77
28.12	253	4000	-10	-1,6	48	0	22	40	26.30	210	196	2,0	77
28.13	252	4000	-10	-1,5	48	0	22	60	24.31	215	200	2,01	77
28.14	253	3500	-10	-2	52	0	22	0	30.34	225	205	2,10	123
28.15	253	3500	-10	-2	53	0	24	20	30.35	228	210	2,20	123
28.16	252	3600	-10	-2	53	0	24	40	29.35	228	210	2,20	123
28.17	253	3150	-10	-2	48	0	24	60	21.32	205	195	1,90	123
28.18	253	3100	-12	-2	56	0	24	0	32.36	238	214	2,28	123
28.19	253	3100	-12	-2	54	0	24	20	32.36	230	211	2,20	123
28.20	251	3000	-12	-2	54	0	24	40	31.37	232	214	2,23	123
28.21	253	2500	-12	-2	48	0	24	60	21.31	198	191	1,80	123

Page 22

Doc DH.2011D.E5

$\theta_{0.7} = 3°$

CAM III $\varphi = -55$

DH.2011D JET FLAP ROTOR
MARCH 71 WIND TUNNEL TESTS

RUN 29
March 29, 1971

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	RUN	R.P.M	T	α_S	α_P	$\bar{A}_0$	$\bar{A}_1$	$\bar{B}_1$	Azimut	δ	Δp	T_1	P_1	V
			lb	deg	deg	%	%	%	%	deg	m.bar	deg. C	bar	kts
1	29.1	Calibration												
2	29.2	253	5100	-6	-1,8	52	0	22	0	30-36	218	182	2,05	77
3	29.3	254	5255	-6	-1 8	52	0	22	20	30-36	220	186	2,10	77
4	29.4	253	5100	-6	-1,8	51	0	22	40	29-36	220	186	2,10	77
5	29.5	253	5100	-6	-1,8	51	0	22	60	28-37	220	186	2,10	77
6	29.6	254	4100	-8	-1,7	48	0	22	0	25-30	200	175	1,85	77
7	29.7	253	4200	-8	-1,7	48	0	22	20	25-31	205	180	1,90	77
8	29.8 : The cam has no affect on the cimatran													
9														
10														
11		Arrêt car le système anti-feu est cassé												
12		Run terminated for breakage of the anti-fire system.												
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														

GIRAVIONS DORAND

TABLE I.23

Doc DH.2011D.E5

RUN 4
$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR. 40 x 80 WIND TUNNEL TESTS. MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS. (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE	
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}		
4.1													
4.2	0.0	5.02	1715.	7.48	190.	-18.	15.52	17.69	1.554	-0.02	-1.26	0.0	
4.3	0.0	5.61	2705.	7.76	292.	-36.	13.36	20.73	2.038	0.11	-1.58	0.0	
4.4	0.0	5.70	3859.	8.41	405.	-62.	12.57	23.82	2.378	0.12	-1.97	0.0	
4.5	0.0	6.03	2055.	7.10	207.	-17.	15.15	21.89	2.311	0.09	-1.20	0.0	
4.6	0.0	5.90	3501.	3.98	184.	-79.	3.85	27.18	2.809	0.09	-3.50	0.0	
4.7	0.0	5.87	3944.	3.77	210.	-140.	2.30	19.60	2.017	0.09	-3.19	0.0	
4.8	0.0	5.90	3015.	6.63	228.	-67	9.87	24.41	2.521	0.15	-3.16	0.0	
4.9	0.0	5.92	3920.	3.66	212.	-111	2.62	22.94	2.378	0.14	-3.21	0.0	
4.10	0.0	5.94	4290.	7.20	465.	-109	8.78	22.24	2.315	0.13	-2.62	0.0	
4.11	0.0	5.86	3640.	1.79	96.	-54	0.82	28.19	2.895	0.25	-2.38	0.0	
4.12	0.0	5.81	4271.	6.41	341.	-32	11.62	36.28	3.690	0.51	-1.62	0.0	
4.14	0.0	5.72	3774.	2.64	119.	-43	2.64	41.85	4.190	0.29	-3.20	0.0	

GIRAVIONS DORAND

TABLE II.1

RUN 5 & 6
5°

DH 2011D JET FLAP ROTOR - 40 x 80 WIND TUNNEL TESTS - MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS - (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPP/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
5.1												
5.2	0.0	7.77	5197.	21.81	1866.	818.	79.84	37.23	5.078.	0.124	32.78	0.0
5.3	0.0	7.96	4200.	20.03	1623.	688.	100.32	42.84	5.994.	-0.000	46.88	0.0
5.4	0.0	7.79	4516.	20.85	1756.	757.	98.26	42.29	5.786	0.073	44.45	0.0
6.1												
6.2	0.250	6.94	3114.	18.60	1322.	518.	169.	62.69	7.62	1.996	93.68	0.2035
6.3	0.240	6.16	3233.	17.85	1214.	477.	158.	65.17	7.03	2.250	85.93	0.20
6.4	0.249	6.46	3506.	17.42	1144.	450.	152.	70.83	8.02	0.816	82.03	0.24
6.5	0.250	5.02	4399.	17.40	1144.	449.	152.	89.14	7.82	2.180	81.89	0.23
6.6	0.251	3.99	4001.	16.53	1012.	398.	139.	81.33	5.67	1.754	72.79	0.19
6.7	0.249	0.94	3791.	15.44	856.	336.	121.	76.73	1.26	0.841	60.89	0.05
6.8	0.250	2.93	5559.	20.64	1678.	648	205.	112.78	5.76	3.385	117.72	0.12
6.9	0.269	3.02	5806.	20.61	1660.	619	235.	135.47	7.14	-0.291	139.17	0.13
6.10	0.279	3.26	5667.	20.52	1657.	603	252.	142.57	8.13	0.054	151.85	0.14
6.11	0.284	3.40	5412.	20.52	1657.	596	262.	141.39	8.40	-0.264	158.96	0.15
6.12	0.289	3.87	5528.	20.55	1664.	591	273.	149.97	10.15	-0.736	166.91	0.17
6.13	0.255	1.22	6580.	20.52	1644.	634	211.	138.77	2.95	3.498	121.85	0.06

GIRAVIONS DORAND

TABLE II.2

RUN 7
$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR - 40 x 80 WIND TUNNEL TESTS - MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS - (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
7.1												
7.2	0.249	2.66	6031.	20.41	1583.	622.	198.	121.81	5.66	-0.605	113.	0.12
7.3	0.259	2.38	6205.	20.28	1581.	609.	213.	135.33	5.61	0.007	123.	0.11
7.4	0.265	3.42	5854.	20.29	1571.	600.	221.	132.54	7.92	0.439	129.	0.16
7.5	0.270	4.50	5517.	20.90	1668.	629.	241.	129.25	10.16	-0.680	143.	0.19
7.6	0.283	5.24	5087.	21.47	1800.	596.	362.	171.36	15.71	1.102	232.	0.19
7.7	0.283	5.69	5179.	21.31	1796.	592.	360	174.51	17.38	1.752	231.	0.21
7.8	0.283	5.69	5083.	21.32	1797.	593.	361	171.27	17.07	1.792	231.	0.20
7.9	0.283	5.81	5017.	21.32	1796.	593.	361	169.30	17.23	1.162	231.	0.21
7.10	0.289	4.33	5338.	21.30	1782.	581.	376	188.38	14.27	-0.574	242.	0.17

GIRAVIONS DORAND

TABLE II.3

RUN 8 & 9
$\theta = 5°$

DH 2011 D JET FLAP ROTOR . 40 x 80 WIND TUNNEL TESTS . MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS . (PROGRAM FSA 0 230)

TABLE II.4

RUN/PT	μ	α	T	W	GHP	ESHP	C_{JK}/σ	C_{LR}/σ	C_{XR}/σ	C_Y/σ	C_{PE}/σ	C_{PP}/C_{PE}
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-8}	10^{-4}	
8.1												
8.2	0.241	3.50	5527.	20.50	1590.	585.	248.	139.08	8.50	1.853	148.	0.13
8.3	0.251	7.11	5323.	22.42	1916.	676.	317.	146.29	18.23	-1.832	198.	0.23
8.4	0.248	5.09	5764.	22.05	1850.	660.	302.	155.41	13,84	-2.268	187.	0.18
8.5	0.253	4.51	5890.	21.96	1848.	651.	311.	164.44	12.97	-2.175	194.	0.16
8.6	0.255	4.41	5994.	22.03	1845.	648.	316.	170.07	13.12	-1.730	197.	0.16
9.1												
9.2	0.397	6.12	3848.	20.12	1520.	553.	263.	106.43	11.41	0.282	159.	0.28
9.3	0.395	6.06	3946.	20.10	1541.	561.	262.	108.03	11.47	-0.276	159.	0.28
9.4	0.406	5.99	4104.	20.31	1565.	560.	281.	118.96	12.48	0.560	173.	0.29
9.5	0.396	5.94	3868.	19.81	1574.	552.	259.	106.51	11.07	1.178	157.	0.27
9.6	0.399	7.74	3686.	19.37	1451.	526.	258.	104.16	14.16	0.084	156.	0.36
9.7	0.401	8.35	3826.	21.24	1756.	626.	301.	108.70	15.94	0.145	187.	0.34
9.8	0.411	8.50	3892.	21.23	1760.	614.	322.	118.01	17.63	0.763	202.	0.35
9.9	0.414	8.15	3711.	21.04	1736.	603.	322.	114.09	16.34	1.006	202.	0.33
9.10	0.414	9.51	3529.	21.01	1730.	602.	321.	108.04	18.10	1.423	201.	0.37
9.11	0.400	6.68	3639.	20.00	1579.	565.	280.	105.62	12.37	2.010	172.	0.28

RUN 10

$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR . 40 x 80 WIND TUNNEL TESTS . MARCH 1971

DATA COMPUTED FROM NASA-AMES MEASUREMENTS . (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE	
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}		
10.1													
10.2	0.255	2.04	5879.	20.19	1604.	573.	285.	165.01	5.88	2.712	169.	0.08	
10.3	0.256	2.15	5865.	20.07	1588.	1588.	287.	167.23	6.28	2.382	171.	0.09	
10.4	0.257	3.15	6120.	20.43	1641.	1641.	297.	175.12	9.64	1.883	177.	0.13	
10.5	0.257	3.58	5476.	20.22	1630.	1630.	299.	159.38	9.96	1.834	179.	0.14	
10.6	0.252	4.14	5399.	19.91	1587.	1587.	299.	160.03	11.58	0.969	179.	0.16	
10.7	0.399	5.66	3764.	19.28	1493	1493.	278.	109.87	10.88	-0.741	164.	0.26	
10.8	0.401	6.22	3911.	19.25	1489	1489.	278.	114.13	12.44	-0.022	163.	0.30	
10.9	0.402	7.71	3717.	19.21	1498	1498.	280.	108.91	14.75	1.139	165.	0.35	
10 10	0.407	8.23	3616.	19.21	1498	1498.	286.	107.90	15.60	-2.026	169	0.37	

GIRAVIONS DORAND

TABLE II.5

Doc DH.2011D.E5

RUN 11
$\theta_{3/4}$ = 5°

DH 2011 D JET FLAP ROTOR. 40 x 80 WIND TUNNEL TESTS. MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS. (PROGRAM FSA 0 [illegible])

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
11.1												
11.2	0.498	4.75	2990.	16.45	1058.	334.	316.	136.78	11.36	0.090	200.	0.28
11.3	0.498	5.29	2973.	16.40	1054.	334.	312.	134.99	12.50	-1.492	198.	0.31
11.4	0.498	5.08	2792.	16.29	1030.	326.	311.	128.42	11.40	-1.810	196.	0.28
11.5	0.487	5.94	2794.	16.82	1119.	356.	319.	123.40	12.84	-1.332	203.	0.30
11.6	0.494	5.37	3040.	16.75	1115.	353.	322.	136.18	12.80	-3.053	204.	0.30
11.7	0.490	3.72	3045.	14.80	862.	277.	358.	135.11	8.77	-2.879	158.	0.27
11.8	0.499	3.77	3136.	15.00	864.	276.	271.	144.95	9.56	-4.379	168.	0.28
11.9	0.495	3.77	2918.	15.16	880.	283.	274.	133.62	8.81	-2.938	169.	0.25
11.10	0.491	1.54	3026.	13.92	716.	234.	228.	136.34	3.67	-1.728	136.	0.13
11.11	0.490	1.86	2820.	13.99	724.	236.	230.	127.04	4.12	-2.970	137.	0.14
11.12	0.493	2.51	2838.	13.90	720.	233	231	129.19	5.65	-2.086	138.	0.20

HAWKER SIDDELEY AVIATION
TABLE 11.6

RUN 12
$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR . 40 x 80 WIND TUNNEL TESTS . MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS . (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPP/CPE	
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}		
12.1	0.248												
12.2	0.248	2.72	5745.	19.07	1441.	523.	245.	155.33	7.38	-0.063	148.	0.12	
12.3	0.248	4.28	5718.	20.10	1517	554.	259.	154.73	11.57	-1.713	157.	0.18	
12.4	0.252	4.92	5671.	20.55	1605	578.	277.	157.26	13.53	-2.103	170.	0.19	
12.5	0.254	5.08	5647.	20.50	1599	573.	282.	159.38	14.15	-2.266	173.	0.20	
12.6	0.255	7.49	4851.	19.83	1510	536.	278.	141.60	18.62	-1.040	171.	0.27	
12.7	0.250	8.63	4854.	20.74	1653	592.	285.	134.55	20.43	-1.452	175.	0.29	
12.8	0.251	9.20	4959.	20.76	1662	593.	289.	138.55	22.43	-1.534	178.	0.31	
12.9	0.251	9.54	4819.	20.72	1659	592.	288.	134.53	22.61	-1.755	178.	0.31	
12.10	0.401	5.52	3653.	19.03	1344	492.	250.	105.96	10.24	0.214	150.	0.27	
12.11	0.390	6.97	3748.	19.65	1461	539.	253.	103.65	12.67	-1.950	152.	0.32	
12.12	0.397	8.18	3711.	20.12	1587	572.	276.	104.61	15.03	-1.642	169.	0.35	
12.13	0.400	8.37	3803.	20.10	1595	565.	291.	112.46	16.55	-1.467	180.	0.36	
12.14	0.394	8.01	3269.	18.57	1356	491.	248.	94.49	13.29	-0.569	149.	0.35	
12.15	0.390	9.39	3441.	19.70	1528	553.	266.	96.57	15.97	-1.434	162.	0.38	
12.16	0.406	9.83	3188.	19.75	1534	541.	290	97.08	16.82	-1.359	179.	0.37	
12.17	0.394	10.43	3456.	20.37	1628	584.	286	98.35	18.11	-1.663	176.	0.40	
12.18	0.409	11.49	2592.	19.13	1457	516.	275	78.86	16.03	-0.657	169.	0.38	
12.19	0.409	13.98	2489.	20.06	1593	561.	297	74.95	18.65	-0.868	184.	0.41	
12.20	0.407	14.36	2550.	20.06	1597	563	295	76.10	19.48	-1.932	183.	0.43	
12.21	0.405	14.36	2617.	20.04	1593	563	292	77.42	19.82	-2.150	181.	0.44	

GIRAVIONS DORAND

TABLE II.7

Doc DH.2011D.E5

RUN 13.
$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR - 40 x 80 WIND TUNNEL TESTS - MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS - (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPP/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
13.1												
13.2	0.248	2.38	5709.	19.82	1474.	535.	257.	156.87	6.51	0.569	155.	0.10
13.3	0.251	3.41	5523.	20.32	1538.	555.	271.	154.23	9.18	-1.156	165.	0.13
13.4	0.246	3.90	5562.	21.00	1646.	598.	276.	149.66	10.21	-1.363	169.	0.14
13.5	0.248	4.17	5561.	20.90	1659.	597.	281.	151.96	11.07	-1.040	172.	0.15
13.6	0.249	6.91	4986.	20.36	1577.	570.	270	136.50	16.53	-0.539	165.	0.24
13.7	0.253	7.80	4684.	20.59	1606.	575.	284	132.29	18.13	-1.316	175.	0.26
13.8	0.249	8.14	4679.	20.99	1660.	599.	284	128.08	18.33	-1.742	174.	0.26
13.9	0.250	8.51	4630.	20.86	1670.	599.	286	127.63	19.09	-0.762	176.	0.27
13.10	0.393	4.89	4023.	19.33	1436.	525.	252	112.62	9.63	0.385	152.	0.24
13.11	0.394	6.19	3679.	19.84	1501.	547.	265	103.69	11.24	-0.531	161.	0.27
13.12	0.397	5.70	3668.	19.69	1503.	542.	271	106.20	10.60	-1.273	165.	0.25
13.13	0.398	6.17	3456.	19.71	1503.	542.	271	100.19	10.82	-1.544	166.	0.25
13.14	0.400	11.28	2854.	20.26	1569.	564.	285.	83.27	16.61	-0.957	175.	0.37
13.15	0.399	12.08	2492.	20.52	1637.	582.	296.	73.38	15.69	-1.326	183.	0.34
13.16	0.401	12.81	2371.	20.36	1643.	582.	296	69.79	15.87	-0.587	183.	0.34
13.17	0.401	12.93	2419.	20.18	1618	574.	292	71.15	16.33	-0.413	181.	0.36

GIRAVIONS DORAND

TABLE II.8

RUN 14 -
$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR - 40 x 80 WIND TUNNEL TESTS - MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS. (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
14.1												
14.2	0.247	2.31	5999.	20.08	1538.	555.	265.	165.	6.69	1.402	161.	0.10
14.3	0.249	3.67	5886.	20.60	1617.	578.	281.	165.	10.58	0.916	172.	0.15
14.4	0.249	3.93	5912.	20.71	1655.	589.	286.	165.	11.40	1.837	176.	0.16
14.5	0.247	4.53	6040.	20.87	1693.	598.	292.	170.	13.55	2.580	181.	0.18
14.6	0.251	6.72	4888.	20.04	1683.	561.	279.	139.	16.45	0.983	171.	0.24
14.7	0.250	8.38	4996.	20.66	1665.	591.	287.	139.	20.53	1.143	177.	0.28
14.8	0.253	8.64	4940.	20.52	1666.	585.	293.	141.	21.55	1.366	182.	0.29
14.9	0.253	8.91	4971.	20.52	1667.	586.	294.	142.	22.37	0.907	182.	0.31
14.10	0.403	4.84	3854.	19.36	1489.	530.	271.	114.	9.66	1.827	166.	0.23
14.11	0.397	6.72	3801.	19.56	1514.	544.	267.	108.	12.78	1.273	162.	0.31
14.12	0.400	6.94	4171.	20.06	1582.	564.	281.	120.	14.71	1.218	172.	0.34
14.13	0.403	7.03	4032.	19.91	1560.	557.	279.	117.	14.45	1.053	171.	0.34
14.14	0.398	11.38	2580.	19.29	1504.	536.	269.	75.	15.13	1.129	164.	0.36
14.15	0.406	12.50	2799.	20.60	1666.	585.	303.	83.	18.54	0.861	188.	0.39
14.16	0.406	12.96	2934.	20.57	1664.	584.	303.	87.	20.14	1.682	188.	0.43
14.17	0.408	13.27	2989.	20.59	1665.	582.	309.	90.	21.33	1.679	192.	0.45

GIRAVIONS DORAND

TABLE II.9

RUN 16
$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR - 40 x 80 WIND TUNNEL TESTS - MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS - (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
16.2	0.252	1.64	5708.	19.86	1472.	538.	255.	155.	4.46	1.417	154.	0.07
16.3	0.251	2.64	5656.	20.64	1604.	578.	278.	157.	7.25	0.891	170.	0.10
16.4	0.253	3.23	5784.	21.24	1704.	608.	295.	162.	9.19	1.382	182.	0.12
16.5	0.252	5.81	4796.	20.05	1523	552	267.	133.	13.59	2.600	163.	0.20
16.6	0.255	6.07	4606.	19.90	1512.	545.	270.	130.	13.89	2.706	165.	0.21
16.7	0.250	6.13	4879.	20.38	1572.	573.	269.	133.	14.28	2.251	163.	0.21
16.8	0.402	2.95	3643.	18.61	1301.	479.	241.	105.	5.42	2.345	144.	0.15
16.9	0.403	3.07	3631.	18.69	1325.	485.	246.	105.	5.66	3.173	147.	0.15
16.10	0.394	3.43	3764.	18.62	1329.	493.	235.	104.	6.27	3.247	140.	0.17
16.11	0.399	9.80	2609.	19.61	1494.	543.	264.	74.	12.83	1.875	160.	0.31
16.12	0.404	9.99	2758.	20.24	1578.	570.	281.	79.	14.06	1.723	172.	0.32
16.13	0.404	9.32	2672.	19.24	1436.	522.	262.	78	12.80	1.405	159	0.32

GIRAVIONS DORAND

TABLE II.10

Doc' DH.2011D.E5

RUN 17.
$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR. 40 x 80 WIND TUNNEL TESTS. MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS. (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
17.2	0.249	2.00	5773.	20.14	1494.	549.	253.	153.	5.35	0.207	152.	0.08
17.3	0.251	2.17	5798.	20.11	1492.	547.	255.	155.	5.91	0.081	154.	0.09
17.4	0.255	3.01	5782.	20.46	1547.	560.	271.	160.	8.42	0.306	165.	0.12
17.5	0.256	3.53	5808.	20.86	1618.	582.	281.	161.	9.96	-0.072	173.	0.14
17.6	0.255	6.85	4646.	20.14	1525.	551.	267.	128.	15.47	-0.660	163.	0.24
17.7	0.253	7.14	4652.	20.03	1525.	549.	269.	130.	16.29	-0.130	165.	0.24
17.8	0.254	7.75	4853.	20.51	1590.	571.	280.	135.	18.49	-0.649	172.	0.27
17.9	0.255	8.27	4847.	20.79	1636.	586.	287.	135.	19.72	-0.404	177.	0.28
17.10	0.255	8.35	4744.	20.42	1586.	567.	281.	133.	19.65	-0.146	173.	0.28
17.11	0.397	4.19	3560.	18.70	1314.	487.	236.	99.	7.31	0.882	140.	0.20
17.12	0.406	4.84	3808.	18.94	1367.	498.	253.	110.	9.37	0.218	153.	0.24
17.13	0.409	5.09	3755.	18.94	1367.	496.	258.	111.	9.91	0.417	156.	0.25
17.14	0.408	5.97	3719.	19.51	1463.	528.	270.	109.	11.41	1.004	165.	0.28
17.15	0.407	5.39	3821.	19.50	1464.	529.	268.	111.	10.52	0.445	163.	0.26
17.16	0.406	10.86	2876.	20.44	1620.	582.	285.	82.	15.83	0.326	175.	0.36
17.17	0.401	11.28	2900.	20.27	1605.	577.	283.	82.	16.54	-0.183	174.	0.38
17.18	0.401	11.81	2985.	20.24	1603.	577.	280.	84.	17.69	-0.085	172.	0.41
17.19	0.405	12.39	2949.	20.47	1645.	589.	289.	84.	18.51	-0.116	178.	0.41

GIRAVIONS DORAND

TABLE II-11

RUN 18
$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR. 40 x 80 WIND TUNNEL TESTS. MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS. (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
18.1												
18.2	0.252	1.67	5538.	19.40	1384.	509.	243.	150.	4.39	1.289	146.	0.07
18.3	0.249	1.69	5495.	19.95	1454.	536.	247.	146.	4.31	1.352	149.	0.07
18.4	0.250	1.91	5568.	20.14	1478.	543.	254.	149.	4.98	1.523	153.	0.08
18.5	0.251	2.08	5665.	20.05	1481.	542.	256.	153.	5.57	1.870	155.	0.09
18.6	0.246	6.32	4870.	20.51	1562.	575.	257	126.	14.04	0.695	155.	0.22
18.7	0.250	6.32	4821.	20.19	1528.	559.	258	128.	14.26	1.045	156.	0.22
18.8	0.249	6.39	4671.	20.20	1527.	560.	256	123.	13.89	1.365	155.	0.22
18.9	0.252	6.92	4652.	20.30	1539.	560.	264	126.	15.32	0.902	161.	0.23
18.10	0.400	3.45	3574.	18.92	1350.	499.	239	99.	5.99	0.542	143.	0.16
18.11	0.397	4.12	3628.	19.26	1390.	515.	243	99.	7.19	1.171	146.	0.19
18.12	0.400	4.30	3695.	19.22	1396.	514.	243	103.	7.79	0.958	149.	0.20
18.13	0.396	10.70	2906.	20.29	1582.	578.	248	79.	15.00	0.573	163.	0.36
18.14	0.396	10.73	2541.	20.24	1575.	576.	267	69.	13.22	0.672	162.	0.32
18.15	0.396	10.58	2518.	20.18	1568.	573.	266	69.	12.92	0.200	161.	0.31
18.16	0.396	10.54	2434.	20.10	1558.	570.	265	67.	12.48	0.515	161.	0.30

GIRAVIONS DORAND

TABLE II.12

RUN 19
$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR. 40 x 80 WIND TUNNEL TESTS. MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS. (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
19.2	0.253	1.67	4908	18.92	13.40	489.	248	140.	4.08	0.814	149.	0.06
19.3	0.256	2.48	4776	18.90	13.38	484.	253	139.	6.03	0.476	153.	0.10
19.4	0.253	2.84	5047	19.32	14.13	513.	257	143.	7.11	0.686	155.	0.11
19.5	0.251	6.82	4124	19.28	14.12	515.	253	115.	13.81	0.127	153.	0.22
19.6	0.251	7.16	3936	19.48	14.34	525.	256	109.	13.74	-0.324	154.	0.22
19.7	0.404	7.56	4106	19.47	14.36	523.	257	114.	15.24	0.210	156.	0.24
19.8	0.403	3.88	3015	17.81	12.21	448.	234	89.	6.07	0.509	139.	0.17
19.9	0.403	4.88	2925	18.16	12.62	464.	239	85.	7.34	0.111	142.	0.20
19.10	0.405	5.27	3233	18.91	13.81	501.	258	95.	8.82	0.112	156.	0.22
19.11	0.408	5.65	3113	18.81	13.70	495.	261	93.	9.27	-0.241	158.	0.23
19.12	0.408	9.95	2037	18.54	13.29	481.	255	61.	10.87	-0.272	154.	0.28

GIRAVIONS DORAND

TABLE II.13

Doc' DH.2011D.E5

RUN 20
$\theta_{0.7} = 5°$

DH 2011 D JET FLAP ROTOR . 40 x 80 WIND TUNNEL TESTS . MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS . (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPP/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
20.1												
20.2	0.502	1.36	3207.	13.89	686.	227.	218.	141.	3.36	-2.545	130.	0.12
20.3	0.505	1.71	3131.	14.53	757.	249.	240.	139.	4.16	-1.372	145.	0.14
20.4	0.493	4.02	3250.	16.32	1047.	337.	295.	139.	9.83	-1.562	186.	0.25
20.5	0.494	4.88	2669.	16.78	1112.	355.	312.	116.	9.92	-0.791	199.	0.24
20.6	0.500	6.96	3142.	19.05	1434.	445.	392.	138.	16.96	-0.785	257.	0.32
20.7	0.498	5.82	3294.	19.72	1518.	471.	411.	145.	14.84	1.287	270.	0.27
20.8	0.592	0.61	2577.	13.75	702.	209.	315.	162.	1.72	-2.283	201.	0.05
20.9	0.588	-0.28	2497.	13.34	667.	198.	295.	155.	-0.75	-2.121	187.	-0.02
20.10	0.601	2.92	1963.	13.72	705.	203.	323.	129.	6.61	0.052	207.	0.19
20.11	0.602	3.26	1968.	13.70	703.	203.	322.	129.	7.39	0.052	207.	0.21
20.12	0.603	5.89	1951.	14.94	877.	248.	384.	128.	13.27	2.00	253	0.31
20.13	0.602	7.05	1958.	14.91	876.	247.	383.	128.	15.93	0.65	253	0.37
20.14	0.691	4.97	1603.	18.91	748.	197.	447.	140.	12.19	1.00	302	0.27
20.15	0.697	2.26	1424.	13.54	712.	185.	439.	130.	5.13	1.42	296	0.12
20.16	0.705	0.61	1037.	10.42	326.	93.	251.	96.	1.02	-2.22	153	0.04
20.17	0.690	1.08	1201.	10.66	343.	99.	251.	106.	2.02	-2.59	153	0.09

GIRAVIONS DORAND

TABLE II.14

RUN 21
$\theta_{0.7} = 3°$

DH 2011 D JET FLAP ROTOR. 40 x 80 WIND TUNNEL TESTS. MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS. (PROGRAM FSA O 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPP/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
21.1												
21.2	0.251	3.17	4687.	19.03	1235.	465.	228.	127.	7.09	0.013	133.	0.13
21.3	0.253	3.38	4639.	18.23	1235.	458.	224.	127.	7.50	0.654	132.	0.14
21.4	0.252	4.13	4653.	18.81	1308.	484.	236	127.	9.23	0.037	140.	0.16
21.5	0.253	4.64	4837.	19.72	1457.	533.	256	133.	10.79	0.0	155.	0.17

GIRAVIONS DORAND

TABLE II.15

RUN 22
$\theta_{0.7} = 3°$

DH 2011 D JET FLAP ROTOR - 40 x 80 WIND TUNNEL TESTS - MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS - (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPP/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
22.1												
22.2	0.256	7.25	4194.	19.92	1515.	542.	275.	120.	15.31	1.230	169.	0.23
22.3	0.255	7.50	4539.	20.73	1629.	584.	286.	127.	16.81	1.142	176.	0.24
22.4	0.256	8.06	4686.	21.27	1702.	608.	297.	131.	18.65	1.362	184.	0.25
22.5	0.256	8.47	4313.	20.73	1649.	589.	289.	121.	18.07	0.973	178.	0.25
22.6	0.255	7.13	4187.	19.62	1502.	538.	270.	119.	14.97	1.062	165.	0.23
22.7	0.256	8.93	4441.	20.99	1700.	603.	299.	126.	19.86	0.199	186.	0.27

GIRAVIONS DORAND

TABLE II.16

RUN 23
$\theta_{0.7} = 3°$

DH 2011 D JET FLAP ROTOR - 40 x 80 WIND TUNNEL TESTS - MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS - (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE	
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}		
23.1													
23.2	0.394	6.10	3803.	20.71	16.71	605.	280.	104.	11.19	0.346	172	0.25	
23.3	0.410	6.32	3906.	21.02	17.15	606.	309.	116.	12.86	0.329	193	0.27	
23.4	0.413	6.53	3943.	20.69	16.73	587.	311.	120.	13.78	1.093	194	0.29	

GIRAVIONS DORAND

TABLE II.17

RUN 24
$\theta_{0.7} = 3°$

DH 2011 D JET FLAP ROTOR . 40 x 80 WIND TUNNEL TESTS . MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS . (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPP/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
24.1												
24.2	0.0	10.59	4438.	20.26	1544.	564.	261.	116.	21.88	0.269	158.	0.0
24.3												
24.4	0.0	11.64	4592.	20.22	1589.	559.	286.	130.	26.92	-0.914	177.	0.0
24.5	0.034	12.79	4479.	20.07	1574.	537.	311.	139.	31.70	-2.806	196.	0.05
24.6	0.032	10.87	4499.	19.97	1557.	552.	278.	126.	24.35	-0.329	171.	0.04
24.7	0.032	11.25	4689.	20.09	1571.	561.	273.	128.	25.62	-0.288	168.	0.04
24.8	0.034	12.53	4473.	19.99	1572.	533.	317.	142.	31.68	-1.142	200.	0.05
24.9	0.404	5.54	3641.	20.44	1636.	583.	293.	106.	10.38	2.014	181.	0.23
24.10	0.402	6.27	3665.	20.38	1629.	583.	288.	105.	11.64	2.049	177.	0.26
24.11	0.302	8.05	3340.	19.63	1529.	552.	269.	94.	13.40	0.994	164.	0.32
24.12	0.403	3.41	3693.	18.36	1316.	479.	246.	108.	6.44	0.857	148.	0.17
24.13	0.400	5.93	3677.	18.70	1355.	496.	248.	105.	10.95	-0.003	149.	0.29
24.14	0.503	3.31	2620.	13.71	772.	247.	243.	120.	6.98	-0.376	149.	0.23
24.15	0.511	2.73	3049.	15.73	955.	304.	304.	144.	6.90	-1.121	192.	0.18
24.16	0.507	2.63	3158.	15.14	863.	279.	276.	147.	6.76	0.840	171.	0.19
24.17	0.509	5.54	2987.	17.69	1208	380	362.	139.	13.48	0.291	234.	0.29
24.18	0.503	4.77	2944.	17.07	1156	365	339.	134.	11.23	1.160	218.	0.25
24.19	0.504	8.02	2654.	19.76	1395	442	413.	122.	17.26	1.469	268.	0.35
24.20	0.503	8.21	2181.	17.01	1138	362	338.	100.	14.45	2.205	216.	0.33
24.21	0.600	5.91	1424.	13.40	650.	190	308.	95.	9.90	0.809	195.	0.30
24.22	0.605	-5.78	1334.	13.07	616.	181	299.	91.	9.21	1.130	188.	0.29

GIRAVIONS DORAND

TABLE II.18

Doc' DH.2011D. E5

RUN 24 (continued)

$\theta_{0.7} = 3°$

DH 2011 D JET FLAP ROTOR - 40 x 80 WIND TUNNEL TESTS - MARCH 1971

DATA COMPUTED FROM NASA-AMES MEASUREMENTS - (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
24.23	0.599	3.27	1770.	13.72	682.	201.	317.	116.	6.66	0.592	202.	0.19
24.24	0.600	2.56	1673.	12.71	581.	171.	281.	111.	5.00	1.117	175.	0.17
24.25	0.600	-0.63	2099.	12.33	530.	158.	262.	139.	-1.53	-0.525	161.	-0.05
24.26	0.598	-1.38	2110.	11.83	461.	140.	235.	139.	-3.34	1.335	141.	-0.14

GIRAVIONS DORAND

TABLE II.19

Doc' DH.2011.D. E.5.

RUN 25

$\theta_{0.7} = 3°$

DH 2011 D JET FLAP ROTOR . 40 x 80 WIND TUNNEL TESTS . MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS . (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
25.1												
25.2	0.248	8.00	4158.	20.83	1396.	528.	248.	109.	15.41	-0.11	146.	0.26
25.3	0.251	8.16	4237.	20.15	1515.	556.	256.	112.	16.10	0.12	155.	0.25
25.4	0.250	8.65	4390.	20.45	1575.	575.	264.	116.	17.74	0.60	161.	0.27
25.5	0.251	8.92	4271.	20.58	1591.	579.	270.	114.	17.96	0.63	164.	0.27
25.6	0.248	3.45	4220.	16.60	1014.	382.	186.	112.	6.78	-0.15	106.	0.15
25.7	0.247	3.65	4202.	17.10	1027.	391.	189.	111.	7.11	0.06	107.	0.16
25.8	0.249	4.25	4276.	17.44	1079.	408.	198.	114.	8.49	0.20	114.	0.18
25.9	0.250	4.97	4254.	17.96	1172.	439.	212.	114.	9.96	0.11	124.	0.20
25.10	0.396	5.23	3732.	21.25	1714.	621.	287.	102.	9.40	0.48	176.	0.21

GIRAVIONS DORAND

TABLE II.20

RUN 26
$\theta_{0.7} = 3°$

DH 2011 D JET FLAP ROTOR. 40 x 80 WIND TUNNEL TESTS. MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS. (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPP/CPE	
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}		
26.1													
26.2	0.405	6.01	3803.	21.55	1789.	638.	303.	107.	11.28	0.716	188	0.24	
26.3	0.410	6.88	3990.	21.42	1772.	627.	309.	115.	13.88	1.210	192	0.29	
26.4	0.408	6.77	3869.	21.20	1757.	621.	305.	111.	13.25	1.254	190	0.28	
26.5	0.404	7.04	3948.	21.09	1750.	622.	299.	111.	13.82	1.550	185	0.30	
26.6	0.410	3.88	3926.	17.87	1318.	472.	244.	115.	7.86	1.009	148	0.21	
26.7	0.402	4.31	4011.	19.12	1409.	515.	252	113.	8.56	0.811	152	0.22	

GIRAVIONS DORAND

TABLE II.21

RUN 27

$\theta_{0.7} = 3°$

DH 2011 D JET FLAP ROTOR . 40 x 80 WIND TUNNEL TESTS . MARCH 1971

DATA COMPUTED FROM NASA-AMES MEASUREMENTS . (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
27.1												
27.2	0.255	8.05	4219.	20.14	1560.	561.	275.	118.	16.76	0.572	169.	0.25
27.3	0.256	7.90	4352.	20.23	1574.	564.	279.	123.	17.72	0.353	172.	0.25
27.4	0.256	8.17	4377.	20.69	1637.	584.	292.	125.	18.02	0.062	180.	0.25
27.5	0.255	8.11	4383.	20.62	1654.	590.	290.	124.	17.70	0.771	179.	0.25
27.6	0.247	2.33	5109.	18.87	1420.	520.	242.	138.	5.65	1.784	146.	0.09
27.7	0.249	2.95	4291.	16.57	1070.	398.	196.	117.	6.06	1.084	113.	0.13
27.8	0.258	2.95	4141.	16.56	1071.	391.	209.	121.	6.25	0.933	122.	0.13
27.9	0.248	4.13	4348.	17.18	1143.	424.	207.	119.	8.59	-0.006	121.	0.17
27.10	0.256	4.63	4107.	16.95	1120.	407.	217.	119.	9.70	0.258	128.	0.19
27.11	0.409	5.73	3656.	19.86	1594.	566.	289.	109.	10.95	1.014	179.	0.25
27.12	0.410	6.17	3499.	20.28	1653.	585.	298.	104.	11.30	0.556	185.	0.24
27.13	0.408	5.97	3560.	20.23	1646.	584.	296.	105.	11.07	0.533	183.	0.24
27.14	0.415	6.80	3487.	20.19	1641.	576.	305.	107.	12.77	1.322	190	0.27
27.15	0.405	2.22	3817.	17.93	1336.	480.	249.	114.	4.42	1.707	151	0.11
27.16	0.405	3.42	3869.	18.98	1472.	529.	269.	114.	6.86	0.602	164.	0.16
27.17	0.409	3.50	3860.	18.43	1391.	499.	261.	116.	7.11	1.264	159	0.18
27.18	0.408	4.08	3818.	18.45	1394.	499.	262.	115.	8.20	1.534	159	0.20

GIRAVIONS DORAND

TABLE II-22

Doc' DH. 2011 D. E5

RUN 28
$\theta_{0.7} = 3°$

DH 2011 D JET FLAP ROTOR. 40 x 80 WIND TUNNEL TESTS. MARCH 1971
DATA COMPUTED FROM NASA-AMES MEASUREMENTS. (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPD/CPE
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	
28.1												
28.2	0.249	2.75	4573.	18.11	1269.	467.	225.	125.	6.01	0.031	133.	0.11
28.3	0.253	2.67	4554.	17.80	1228.	449.	227.	129.	6.03	0.409	135.	0.11
28.4	0.249	2.86	4645.	18.16	1272.	469.	227.	128.	6.40	0.182	134.	0.11
28.5	0.251	3.24	4591.	18.18	1260.	465.	228.	127.	7.23	-0.039	135.	0.13
28.6	0.252	5.10	3750.	16.87	1117.	411.	207.	105.	9.40	0.056	121.	0.19
28.7	0.251	5.22	3713.	16.63	1059.	392.	200.	104.	9.52	-0.039	115.	0.20
28.8	0.240	5.25	3538.	16.59	1054.	392.	196.	97.	9.00	-0.265	113.	0.19
28.9	0.248	5.71	3780.	17.33	1140.	426.	207.	102.	10.28	-0.135	120.	0.21
28.10	0.254	7.21	3824.	18.18	1278.	468.	235.	108.	13.67	0.023	140.	0.24
28.11	0.252	7.44	3714.	17.89	1244.	457.	226.	103.	13.51	-0.082	134.	0.25
28.12	0.252	7.34	3580.	17.85	1238.	456.	226.	99.	12.87	-0.206	133.	0.24
28.13	0.252	8.08	3726.	18.02	1260.	463.	229.	103.	14.73	0.710	136.	0.27
28.14	0.404	6.01	3360.	18.48	1364	494.	252.	98.	10.38	0.036	152.	0.27
28.15	0.402	5.58	3390.	18.91	1420	516.	257.	98.	9.61	0.031	156.	0.24
28.16	0.403	5.81	3464.	18.85	1421	513.	261.	101.	10.38	-0.187	158.	0.26
28.17	0.403	5.53	2650.	17.25	1217	443.	227.	77.	7.53	-0.871	135.	0.22
28.18	0.401	8.09	2959	19.42	1505	546.	268.	85.	12.14	0.519	163.	0.29
28.19	0.397	7.60	2941.	19.02	1454	530.	256.	83.	11.17	0.126	155.	0.28
28.20	0.408	8.00	2881.	19.15	1472	528.	271.	85.	12.07	-0.255	166.	0.29
28.21	0.400	8.15	2037.	16.84	1121	414.	212.	59.	8.48	-0.412	124.	0.27

GIRAVIONS DORAND

TABLE II.23

Page 46

Doc' DH. 2011 D. E5

RUN 29

$\theta_{0.7} = 3°$

DH 2011 D JET FLAP ROTOR - 40 x 80 WIND TUNNEL TESTS - MARCH 1971

DATA COMPUTED FROM NASA-AMES MEASUREMENTS - (PROGRAM FSA 0 230)

RUN/PT	μ	α'	T	W	GHP	ESHP	CJR/σ	CLR/σ	CXR/σ	CY/σ	CPE/σ	CPP/CPE	
		degrees	lb	lb/s	hp	hp	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}		
29.1													
29.2	0.249	2.98	4548	18.59	1272.	472.	225.	122.	6.38	-0.267	133.	0.11	
29.3	0.248	3.15	4803	18.98	1319.	490.	230.	128.	7.06	-0.111	136.	0.12	
29.4	0.248	3.43	4652	18.86	1306.	485.	227.	123.	7.43	-0.201	134.	0.13	
29.5	0.248	3.86	4749	18.84	1303.	485.	227.	126.	8.53	-0.056	134.	0.15	
29.6	0.248	5.68	3853	17.46	1122.	421.	220.	101.	10.12	-0.001	115.	0.21	
29.7	0.249	5.86	3902	17.79	1160.	435.	207.	103.	10.65	-0.092	120.	0.21	

GIRAVIONS DORAND

TABLE II.24

Doc. DH.2011D.E5

GIRAVIONS DORAND

Table III

MULTICYCLIC CAM COEFFICIENTS

(in degrees of flap deflection)

Values corresponding to 60% of cam travel for $\varphi = 0°$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
CAM		$\bar{A}_2$	$\bar{B}_2$	$\bar{A}_3$	$\bar{B}_3$	$\bar{A}_4$	$\bar{B}_4$		Runs where used				
		deg	deg	deg	deg	deg	deg						
I		-11								6 → 9			
III		-2.5	-2.3	3.5	3.	-2.5				28 → 29			
IV		-2.5	-9.	3.5	4.	-2.5			10 → 16		20 → 27		
V					-7.					17 → 19			

Doc. DH.2011 D_E.5

σ_1 : stress without cam
σ_2 : stress with cam

STRESS REDUCTION : $\dfrac{\sigma_1 - \sigma_2}{\sigma_1}$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	CAM AMPL.	Ampl. max 4.2/1	Ampl. max 4-3/1	Reduction, % 4.2/1	4.3/1		RUN	CAM AMPL.	Ampl. max 4.2/1	Ampl. max. 4.3/1	Reduction, % 4.2/1	4.3/1	
	%	mm	mm	%	%			%	mm	mm	%	%	
7.2	0	55.	36.	+33.4%			12-14	14	31.7	31.0	-52		
7.5	60	35.	25.6		+29.3%		12.17	75	48.2	39.3		-26.8	
7.6	0	58.5	47.7	+1%			12.18	14	30.5	26.7	-49.8		
7.9	60	57.9	43.2		+9.4%		12.21	75	45.7	37.2		-39.3	
8.4	0	58.0	41.8	+16%			13.2	14	56.9	38.9	-17.7		
8.6	40	48.7	34.0		+18.7%		13.5	75	67.0	58.4		-50.1	
9.3	0	38.9	31.2	-4.9%			13.4	14	40.4	30.8	-74.5		
9.6	60	40.8	29.2		+6.4%		13.9	75	70.5	50.0		-62.3	
9.7	0	36.0	31.5	-3.6%			13.10	14	44.4	35.5	-14.4		
9.10	60	37.3	27.2		+13.7%		13.13	75	73.0	54.0		-52.1	
12.2	14	50.2	29.4	-7%			13.14	14	33.4	30.1	-63.8		
12.5	75	53.7	44.8		-52.4%		13.17	75	54.7	41.9		-35.3	
12.6	14	39.0	28.2	-20%			14.2	14	57.2	35,3	-80.6		
12.9	75	46.8	37.5		-33%		14.5	75	103.3	63.6		-80.2	
12.10	14	41.4	35.6	-29%			14.6	14	41.0	30.5	-94.4		
12.13	75	53.7	43.4		-21.9%		14.9	75	79.7	53.2		-74.4	

σ_1 : stress without cam
σ_2 : stress with cam

STRESS REDUCTION : $\frac{\sigma_1 - \sigma_2}{\sigma_1}$

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
RUN	CAM AMPL.	Ampl. max. 4.2/1	Ampl. max 4-3/1	REDUCTION, % 4.2/1	4.3/1		RUN	CAM AMPL.	Ampl. max 4.2/1	Ampl. max. 4.3/1	REDUCTION 4.2/1	4.3/1	
	%	mm	mm	%	%			%	mm	mm	%	%	
14.10	14	49.4	38.2	-80.2			17.15	80	58.0	43.0		-36.2	
14.13	75	89.0	65.8		-72.3		17.16	14	32.2	28.5	-5		
14.14	14	32.0	26.3	-128.7			17-19	60	33.8	25.8		+9.5	
14.17	75	73.2	54.8		-108.4		18.2	14	51.3	33.4	+15.0		
16.2	17	48.8	31.7	+20.1			18.5	60	43.0	28.3		+15.3	
16.4	60	39.0	29.3		+7.6		18.6	14	37.8	26.2	+12.2		
16.5	17	40.	25.4	+34.			18.9	60	33.2	22.6		+15.9	
16.7	60	26.5	21.0		+17.3		18.10	14	46.3	35.3	+1.7		
16.8	17	40.	30.9	+40.			18.12	60	45.5	32.5		+7.9	
16.10	60	24.	23.5		+23.9		18.13	14	26.8	24.6	-20.1		
16.11	17	25.8	23.2	+7			18.16	80	32.2	24.0		+2.4	
16.13	60	24.0	23.8		+2.6		19.2	14	48.7	32.2	+28.1		
17.2	17	54.6	34.2	-17.6			19.4	60	35.0	25.7		+20.2	
17.5	60	64.2	43.3		-26.6		19.5	14	36	24.9	+31		
17.6	14	42.5	30.2	-24.9			19.7	60	25	23.2		+6.8	
17.10	80	53.1	38.8		-28.5		19.8	14	37.8	29.6	+47.1		
17.11	14	37.5	31.6	-54.7			19.11	80	27.0	24.1		+18.6	

GIRAVIONS DORAND

TABLE IV.2

Doc' DH.2071C.E5

σ_1: stress without cam
σ_2: stress with cam

STRESS REDUCTION : $\dfrac{\sigma_1 - \sigma_2}{\sigma_1}$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	CAM AMPL.	Ampl. max. 4. 2/1	Ampl. max 4. 3/1	REDUCTION, % 4.2/1	4. 3/1		RUN	CAM AMPL.	Ampl. max. 4. 2/1	Ampl. max. 4. 3/1	REDUCTION 4. 2/1	4. 3/1	
	%	mm	mm	%	%			%	mm	mm	%	%	
20.2	0	43.3	34.0	+11.8			24.16	60	49.4	39.9		-18.0	
20.3	60	38.2	34.7		-2.1		24.17	20	43.6	31.0	-10.5		
20.4	0	43.5	41.0	+5.3			24.18	60	48.2	32.7		-5.5	
20.5	60	41.2	36.3		+11.5		24.19	20	37.0	25.8	-4.3		
20.6	0	44.3	31.7	-18.7			24.20	60	38.6	26.0		-0.8	
20.7	60	52.6	38.0		+19.9		24.21	20	27.3	19.4	+12.8		
21.2	0	50.0	31.8	-0.8			24.22	60	23.8	17.1		+11.9	
21.5	60	50.4	32.3		-1.6		24.23	20	25.5	21.3	-0.8		
22.2	0	42.0	31.3	+8.3			24.24	60	25.7	20.3		+4.7	
22.5	60	38.5	27.6		+11.8		24.25	20	23.2	18.5	-16.4		
24.5	0	14.5	12.0	-40.0			24.26	60	27.0	19.3		-4.3	
24.7	60	20.3	18.8		-56.7		20.8	20	27.0	18.5	5.5		
24.9	20	41.0	32.7	+16.6			20.9	40	25.5	18.0		+2.8	
24.11	60	34.2	27.3		+14.1		20.12	0	21.5	14.5	13.3		
24.12	20	49.8	38.0	+21.7			20.13	38	19.0	15.5		-7	
24.13	60	39.0	30.0		+21.1		20.16	0	45.0	43.0	55.0		
24.15	20	45.3	33.8	-9.1			20.17	40	29.0	28.0		+35.	

GIRAVIONS DORAND

TABLE IV.3

Doc' DH.2011 D_E5

σ_1 : stress without cam

σ_2 : stress with cam

STRESS REDUCTION : $\dfrac{\sigma_1 - \sigma_2}{\sigma_1}$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	CAM AMPL.	Ampl. max. 4.2/1	Ampl. max. 4.3/1	REDUCTION, % 4.2/1	4.3/1		RUN	CAM AMPL.	Ampl. max. 4.2/1	Ampl. max. 4.3/1	REDUCTION 4.2/1	4.3/1	
	%	mm	mm	%	%			%	mm	mm	%	%	
23.2	0	32.0	33.0	-27			27.15	0	51.0	43.0	-3.9		
23.4	40	41.0	35.0		-6		27.18	75	53.0	39.0		-9.3	
25.2	0	36.0	27.0	+2.8			28.2	0	47.0	32.0	10.6		
25.5	60	35.0	27.0		0		28.5	60	42.0	29.0		9.4	
25.6	0	41.0	28.0	+12.2			28.6	0	36.0	27.0	11.1		
25.9	60	36.0	24.0		+14.3		28.9	60	32.0	22.0		18.5	
26.2	0	41.0	35.0	-9.8			28.10	0	38.0	29.0	21		
26.5	75	45.0	37.0		-5.7		28.13	60	30.0	22.0		24.1	
26.6	0	46.0	36.0	-2.2			28.14	0	34.0	30.0	-11.7		
26.7	40	47.0	37.0		-2.8		28.17	60	38.0	29.0		3.36	
27.2	0	38.0	30.0	-31.5			28.18	0	35.0	26.0	+11.5		
27.5	60	50.0	36.0		-20		28.21	60	31.0	24.0		+7.7	
27.7	0	44.0	29.0	-22.7			29.2	0	48.0	32.0	+9.7		
27.10	60	53.0	36.0		-24		29.5	60	47.0	29.0		+9.4	
27.11	0	40.0	35.0	-20			29.6	0	40.0	26.0	2.5		
27.12	75	48.0	34.0		2.9		29.7	20	39.0	26.0		0	

GIRAVIONS DORAND

TABLE IV.4

Doc' DH.2011D.E5

X_1 : load without cam

X_2 : load with cam

REDUCTION OF VIBRATORY FORCES

$$\frac{X_1 - X_2}{X_1}$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN/δ	CAM AMPL.	S 1	Reduction		RUN/δ	CAM AMPL.	S.1	Reduction		RUN/δ	CAM AMPL.	S1	Reduction
	%	mm	%			%	mm	%			%	mm	%
13.6	14	27.0			14.6	14	30.0			16.5	17	32.0	
13.7	40	22.5			14.7	40	24.0	20		16.6	40	31.5	−1.5
13.8	60	22.0			14.8	60	26.0			16.7	60	34.0	
13.9	75	20.5	24		14.9	75	25.0			16.8	17	48.0	
13.10	14	43.			14.10	14	44.0			16.9	40	49.0	−2.1
13.11	40	26.	43		14.11	40	40.5			16.10	60	51.5	−7.3
13.12	60	25.0			14.12	60	40.0			16.11	17	39.0	
13.13	75	24.5			14.13	75	37.0	15.9		16.12	40	45.0	−15.4
13.14	14	37			14.14	14	34.5			16.13	60	46.5	−19.2
13.15	40	25.0			14.15	40	31.5	8.7		17.2	17	34.0	
13.16	60	23.5	36		14.16	60	33.0			17.3	20	34.0	
13.17	75	29.0			14.17	75	37.0			17.4	40	32.5	
14.2	14	31.5			15.2	17	35.3			17.5	60	26.5	22
14.3	40	29.5	3.2		16.2	17	31.5			17.6	14	28.0	
14.4	60	33.5			16.3	40	32.8			17.7	25	32.5	
14.5	75	34.5			16.4	60	30.0	4.8		17.8	40	25.5	

GIRAVIONS DORAND

TABLE V.2

Page 53

Doc' DH.2011D-E5

X_1 : force without cam
X_2 : force with cam

REDUCTION OF VIBRATORY FORCES

$$\frac{X_1 - X_2}{X_1}$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN / δ	CAM AMPL.	S 1	Reduction		RUN / δ	CAM AMPL.	S 1	Reduction		RUN / δ	CAM AMPL.	S 1	Reduction
	%	mm	%			%	mm	%			%	mm	%
7-2	0	39.0			9.4	20	37.0			12.10	14	31.0	
7.3	20	41.6			9.5	40	30.6			12.11	40	34.6	
7.4	40	34.5			9.6	60	24.0	7.7		12.12	60	35.5	
7.5	60	24.5	37.2		9.7	0	23.2			12.13	75	30.6	1.6
7.6	0	47.5			9.8	20	37.2			12.14	14	37.1	
7.7	20	43.0			9.9	40	42.6	-83.5		12.15	40	35.0	
7.8	40	38.7	18.5		9.10	60	31.5	-35.8		12.16	60	34.2	
7-9	60	42.6			9.11	0	30.7			12.17	75	30.6	17.5
7.10	0	50.5			12.2	14	31.4			12.18	14	35.0	
8.2	0	31.4			12.3	40	25.7	-18.2		12.19	40	32.5	
8.3	0	20.5			12.4	60	33.0			12.20	60	30.5	
8.4	0	19.5			12.5	75	32.5			12.21	75	30.0	14.3
8.5	20	17.0	12.8		12.6	14	36.0			13.2	14	29.5	
8.6	40	18.0			12.7	40	24.3	37.6		13.3	40	26.0	11.9
9.2	0	26.0			12.8	60	22.5			13.4	60	28.0	
9.3	0	26.0			12.9	75	26.6			13.5	75	29.5	

GIRAVIONS DORAND

TABLE V.1

Page 54

Doc: DH 2011D. E5

x_1 : force without cam
x_2 : force with cam

REDUCTION OF VIBRATORY FORCES

$$\frac{x_1 - x_2}{x_1}$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN/S	CAM AMPL.	S 1	Reduction		RUN/S	CAM AMPL.	S 1	Reduction		RUN/S	CAM AMPL.	S 1	Reduction
	%	mm	%			%	mm	%			%	mm	%
17.9	60	24.5			18.7	25	44.0			19.8	14	47.5	
17.10	80	21.5	23.2		18.8	40	27.0			19.9	40	40.0	
17.11	14	46.0			18.9	60	25.0	16.7		19.10	60	38.0	
17.12	25	44.0			18.10	14	47.0			19.11	80	35.5	25.3
17.13	40	40.5			18.11	40	41.5	11.7		19.12	14	40.0	
17.14	60	39.0	15.2		18.12	60	42.0			20.2	0	32.5	
17.15	80	46.0			18.13	14	36.5			20.3	60	28	13.8
17.16	14	42.5			18.14	40	39.5			20.4	0	39.0	
17.17	25	38.2			18.15	60	35.5			20.5	60	33.0	15.4
17.18	40	41.0			18.16	80	33	9.6		20.6	0	40.0	
17.19	60	32.0	2.5		19.2	14	32.5			20.7	60	37.5	6.25
18.2	14	36.3			19.3	40	30			20.8	20	30.0	
18.3	25	35.0			19.4	60	27.5	15.4		20.9	40	32.0	-6.7
18.4	40	36.5			19.5	14	21			20.10	40	32.5	
18.5	60	31.0	14.6		19.6	40	18.0			20.11	0	37.5	
18.6	14	30.0			19.7	60	16.0	23.8		20.12	0	28.0	

GIRAVIONS DORAND

TABLE-5.3

Doc' DH.2011 D. E5.

x_1 : force without cam
x_2 : force with cam

GIRAVIONS DORAND

TABLE V.4

REDUCTION OF VIBRATORY FORCES

$$\frac{x_1 - x_2}{x_1}$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN/δ	CAM AMPL.	S.1	Reduction		RUN/δ	CAM AMPL.	S.1	Reduction		RUN/δ	CAM AMPL.	S.1	Reduction
	%	mm	%			%	mm	%			%	mm	%
20.13	38	30.0	-7		23.3	20	42.5	0		24.16	60	33.5	0
20.14	0	30.0			23.4	40	44.5			24.17	20	30.0	
20.15	20	32.5	-8		24.2	0	12.0			24.18	60	32.5	-8.3
20.16	0	23			24.3	0	9.5			24.19	20	28.5	
20.17	40	26	-13		24.4	0	7.5			24.20	60	21.5	24.5
21.2	0	22.0			24.5	0	7.0			24.21	20	28.5	
21.3	20	21.5			24.6	40	60	14.3		24.22	60	21.0	26.3
21.4	40	19.5	11.4		24.7	60	13.0			24.23	20	27.5	
21.5	60	22.0			24.8	60	20.0			24.24	60	26.5	3.6
22.2	0	24.			24.9	20	44.			24.25	20	25.0	
22.3	20	24.5			24.10	40	39.0			24.26	60	21.0	16
22.4	40	21.0			24.11	60	25.	43.		25.2	0	24.	
22.5	60	16.	33		24.12	20	44			25.3	20	21.5	
22.6	0	26.5			24.13	60	28.5	35		25.4	40	16.0	
22.7	0	18.5			24.14	20	32.0			25.5	60	11.5	48
23.2	0	42.5			24.15	20	33.5			25.6	0	18.0	

Doc' DH.2011D.E5

GIRAVIONS DORAND

TABLE V.5

Preceding page blank

x_1 : force without cam
x_2 : force with cam

REDUCTION OF VIBRATORY FORCES

$$\frac{x_1 - x_2}{x_1}$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN/S	CAM AMPL.	S.1	REDUCTION		RUN/S	CAM AMPL	S.1	REDUCTION		RUN/S	CAM AMPL.	S.1	REDUCTION
	%	mm	%			%	mm	%			%	mm	%
25.7	20	14.5	19.4		27.10	60	20.0	26		28.11	20	30.5	
25.8	40	15.0			27.11	0	49.0			28.12	40	28.5	
25.9	60	17.0			27.12	40	43.0			28.13	60	24.0	22.6
25.10	0	42.5			27.13	60	38.0			28.14	0	41.5	
26.2	0	42.5			27.14	75	37.0	24,5		28.15	20	45.0	
26.3	40	31.5	25.9		27.15	0	52.5			28.16	40	42.0	
26.4	60	38.0			27.16	40	42.5			28.17	60	37.0	10.8
26.5	75	34.0			27.17	60	42.0			28.18	0	39.0	
26.6	0	44.0			27.18	75	33.0	37.2		28.19	20	38.5	
26.7	40	41.0	6.8		28.2	0	25.0			28.20	40	43.0	
27.2	0	22.5			28.3	20	21.5	14		28.21	60	31	20.5
27.3	20	22.0			28.4	40	26.0			29.2	0	25.5	
27.4	40	21.0			28.5	60	30.0			29.3	20	27.0	
27.5	60	15.	33.		28.6	0	23.5			29.4	40	27.5	
27.6		31.5			28.7	20	26.5	-12.8		29.5	60	22.5	11.7
27.7	0	27.0			28.8	40	25.0			29.6	0	23.0	
27.8	20	25.0			28.9	60	24.5	-4,2		29.7	20	24.5	-6.5
27.9	40	27.0			28.10	0	31.0						

FOURIER COEFFICIENTS OF THE MULTICYCLIC CAM DEFLECTION ORDER (CAM) AND THE ACTUAL FLAP DEFLECTION (FLAP).

$$\delta = \delta_2 \cos 2\Psi + \delta_2' \sin 2\Psi + \delta_3 \cos 3\Psi + \delta_3' \sin 3\Psi + \delta_4 \cos 4\Psi + \delta_4' \sin 4\Psi$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	CAM	φ_c	Azimut			δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'		
		degree	%			degree	degree	degree	degree	degree	degree		
9.3	I	0	0		Cam	0.	0.	0.	0.	0.	0.		
					Flap	0.3	0.3	1.6	-0.2	-0.2	0.4		
9.4	I	0	20		Cam	-3.1	0.	0.	0.	0.	0.		
					Flap	-1.8	-0.8	0.5	0.	-0.3	0.2		
9.5	I	0	40		Cam	-7.3	0.	0.	0.	0.	0.		
					Flap	-4.6	-2.7	-0.2	0.	-0.4	-0.7		
9.6	I	0	60		Cam	-11.	0.	0	0.	0.	0.		
					Flap	-9.2	0.2	0.2	1.	-1.1	0.1		
9.7	I	0	0		Cam	0.	0.	0.	0.	0.	0.		
					Flap	0.3	0.3	1.	0.5	-0.2	0.4		
9.10	I	0	60		Cam	-11	0.	0.	0.	0.	0.		
					Flap	-6.7	-3.6	0.	0.4	-0.8	-1.		

FOURIER COEFFICIENTS OF THE MULTICYCLIC CAM DEFLECTION ORDER (CAM) AND THE ACTUAL FLAP DEFLECTION (FLAP).

$$\delta = \delta_2 \cos 2\Psi + \delta_2' \sin 2\Psi + \delta_3 \cos 3\Psi + \delta_3' \sin 3\Psi + \delta_4 \cos 4\Psi + \delta_4' \sin 4\Psi$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	CAM	φ_c	Azimut			δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'		
		degree	%			degree	degree	degree	degree	degree	degree		
12.10	IV	-95	14		Cam	-0.2	-2.2	-1.1	0.5	0.5	0.2		
					Flap	0.8	-0.6	0.3	-0.2	-0.3	0.1		
12.11	IV	-95	40		Cam	-0.6	-6.2	-3.2	1.6	1.6	0.6		
					Flap	2.2	-4.4	-0.4	-1.8	0.2	14		
12.12	IV	-95	60		Cam	-0.9	-9.3	-4.8	2.3	2.3	0.8		
					Flap	-0.4	-1.6	-3.1	-1.8	1.7	1.		
12.13	IV	-95	75		Cam	-1.1	-11.6	-5.9	2.9	2.9	1.1		
					Flap	-0.8	-9.8	-4.1	-2.1	2.1	1.		
13.14	IV	0	14		Cam	0.6	2.1	-0.8	-0.9	0.6	0.		
					Flap	-0.2	0.5	0.9	0	-0.3	0.		
13.15	IV	0	40		Cam	1.7	6.	-2.3	-2.7	1.7			
					Flap	-2.3	4.2	1.6	-2.8	0.	1.7		
13.16	IV	0	60		Cam	2.5	9.	-3.5	-4.	2.5	0		
					Flap	-4	7.3	2.3	-3.4	0.6	2.5		
13.17	IV	0	75		Cam	3.1	11.3	-4.4	-5	3.1	0		
					Flap	-5.7	9.2	3.6	-3.9	0.3	2.8		

GIRAVIONS DORAND

TABLE VII - 2

Doc' DH.2011D.E5

FOURIER COEFFICIENTS OF THE MULTICYCLIC CAM DEFLECTION ORDER (CAM) AND THE ACTUAL FLAP DEFLECTION (FLAP).

$$\delta = \delta_2 \cos 2\Psi + \delta_2' \sin 2\Psi + \delta_3 \cos 3\Psi + \delta_3' \sin 3\Psi + \delta_4 \cos 4\Psi + \delta_4' \sin 4\Psi$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	CAM	φ_c	AZIMUT			δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'		
		degree	%			degree	degree	degree	degree	degree	degree		
14.10	IV	105	14		Cam	-1.6	-1.5	0.	-1.2	0.3	-0.5		
					Flap	0.	-1.1						
14.11	IV	105	40		Cam	-4.4	-4.4	0.2	-3.5	0.8	-1.4		
					Flap	-2.2	-4.2	0.9	-1.	0.6	-1.2		
14.12	IV	105	60		Cam	-6.7	-6.5	0.3	-5.3	1.2	-2.2		
					Flap	-4.6	-7.	1.3	-2.6	1.	-2.3		
14.13	IV	105	75		Cam	-8.3	-8.2	0.4	-6.6	1.6	-2.7		
					Flap	-3.5	-10.3	2.9	-2.3	1.8	-2.1		
16.8	IV	45	17		Cam	2.6	-0.7	-0.1	1.5	-0.7	0.		
					Flap	0	0.5	0.	-0.1	0.1	-0.1		
16.9	IV	45	40		Cam	6.	-1.7	-0.2	3.5	-1.7	0.		
					Flap	3.4	1.1	-0.8	-0.1	-0.7	-0.6		
16.10	IV	45	60		Cam	9.	-2.5	-0.3	5.3	-2.5	0.		
					Flap	6.8	0.9	-1.8	0.5	-1.4	-1.1		
16.12	IV	45	40		Cam	6	-1.7	-0.2	3.5	-1.7	0		
					Flap	3.1	-1.	-0.2	0.6	-0.5	0.6		

GIRAVIONS DORAND

TABLE VII.3

Page 61

Doc' DH.2011D.E5

FOURIER COEFFICIENTS OF THE MULTICYCLIC CAM DEFLECTION ORDER (CAM) AND THE ACTUAL FLAP DEFLECTION (FLAP).

$$\delta = \delta_2 \cos 2\Psi + \delta_2' \sin 2\Psi + \delta_3 \cos 3\Psi + \delta_3' \sin 3\Psi + \delta_4 \cos 4\Psi + \delta_4' \sin 4\Psi .$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN	CAM	φ_c	AZIMUT			δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'		
		degree	%			degree	degree	degree	degree	degree	degree		
16.13	IV	45	60		Cam	9	-2.5	-0.3	5.3	-2.5	0		
					Flap	6.6	0	-1.5	1.	-1.6	-0.6		
18.10	V	90	14		Cam	0	0	-1.6	0	0	0		
					Flap	0.2	0.6	0.	0	0	0		
18.11	V	90	40		Cam	0	0	-4.7	0	0	0		
					Flap	0	0	0.3	-0.8	0.2	0		
18.12	V	90	60		Cam	0	0	-7	0	0	0		
					Flap	0	0	-0.6	-2.	-0.2	0		
19.8	V	15	14		Cam	0	0	1.1	1.1	0	0		
					Flap	0	0.3	0.2	0.4	-0.3	-0.2		

$\theta_{0.7R} = 5°$

TABLE VIII. JET-FLAP DEFLECTION FOURIER COEFFICIENTS (TRACE 24) AND ROTOR SHAFT ANGLE α_S.

(δ and α_S in degrees)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN PT	δ_0	δ_1	δ_1'	δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'	α_S			
09.03	23.4	5.15	-9.86	0.356	0.303	1.64	-0.159	-0.212	0.430	-10°			
09.04	25.9	4.46	-8.66	-1.79	-0.797	0.527	0.0604	-0.344	-0.150	-10°			
09.05	23.9	4.96	-8.76	-4.58	-2.70	-0.163	0.0540	-0.381	-0.738	-10°			
09.06	21.8	2.67	-14.14	-9.20	-0.240	0.140	1.07	-1.15	0.135	-10°			
12.10	22.2	3.80	-2.94	0.828	-0.630	0.317	-0.232	-0.258	0.138	-10°			
12.11	22	7.74	-7.96	2.21	-4.40	-0.375	-1.78	0.161	1.36	-10°			
12.12	23.8	5.87	-13.98	-0.361	-7.63	-3.08	-1.83	1.72	1.04	-10°			
12.13	23.8	5.54	-15.5	-0.81	-9.78	-4.08	-2.12	2.12	0.98	-10°			
14.10	24.7	3.09	-2.61	0	-1.14	0.49	0.33	0.244	0	-10°			
14.11	24.9	3.18	-9.63	-2.17	-4.20	0.958	-0.979	0.615	-1.18	-10°			
14.12	24.8	0.651	-9.94	-4.56	-7.00	1.3	-2.6	0.979	-2.28	-10°			
14.13	25.4	0.22	-10.32	-3.50	-10.33	2.951	-2.315	+1.82	-2.13	-10°			
16.08	23.3	-0.491	0.123	-0.0636	0.511	0.0274	-0.0708	0.0626	-0.126	-10°			
16.09	22.6	-1.91	0.312	3.40	1.06	-0.782	-0.084	-0713	-0.642	-10°			
16.10	21.8	-2.81	0175	6.80	0.918	-1.82	0.460	-1.398	-1.06	-10°			

GIRAVIONS DORAND

TABLE VIII.1

Doc' DH.2011D.E5

$\theta_{0.7R} = 5°$

TABLE VIII (continued) JET-FLAP DEFLECTION FOURIER COEFFICIENTS (TRACE 24) AND ROTOR SHAFT ANGLE α_s.

(δ and α_s in degrees)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN PT	δ_0	δ_1	δ_1'	δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'	α_s			
18.10	23.3	0.815	-1.14	0.244	0.571	0	0	0	0	-10			
18.11	24.3	0.815	-2.12	0	0	0.326	-0.815	0.163	0	-10			
18.12	24.2	0	-4.08	0	0	-0.652	-1.96	-0.244	0	-10			
19.8	20.7	1.96	-1.79	0	0.326	0.163	0.408	-0.326	-0.244	-10			
19.9	21.1	4.08	-4.41	0	0	-0.326	1.47	-0.326	-0.652	-10			
19.10	22.3	0.979	-7.02	0.326	0	2.44	1.63	-0.326	0	-10			
19.11	22.7	0.489	-7.99	0.163	0	2.28	3.42	-0.733	-0.326	-10			
13.14	27.3	3.27	-3.89	-0.15	0.47	0.93	0	-0.31	0	-15			
13.15	28.6	6.07	-9.95	-2.34	4.2	1.55	-2.8	0	1.71	-15			
13.16	28.6	4.82	-12	-4.04	7.31	2.34	-3.42	0.62	2.49	-15			
13.17	27.9	4.82	-12.43	-5.75	9.17	3.57	-3.89	0.31	2.8	-15			
16.12	27.2	-1.72	0	3.1	-0.98	-0.163	0.652	-0.489	0.652	-15			
16.13	27.4	-2.77	0.326	6.6	0	-1.47	0.98	-1.63	-0.652	-15			
9.7	27.1	6.03	-7.99	0.326	0.326	1.06	0.489	-0.163	0.407	-12			
9.10	30.6	3.59	-12.05	-6.68	-3.59	0	0.407	-0.815	-0.98	-12			

$\theta_{0.7R} = 5°$

TABLE IX – FOURIER COEFFICIENTS OF THE FLAP BENDING STRESS AT 0.45 R. (TRACE 19)

(Values in hectobars)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
												HARM – ANAL.	
RUN PT	σ_0	σ_1	σ_1'	σ_2	σ_2'	σ_3	σ_3'	σ_4	σ_4'	μ		NASA	G.D
09.03	7.93	1.64	0.0254	0.173	0.497	2.38	-0.567	-1.27	0.641	0.404		x	
09.04	8.25	1.46	0.389	-0,225	0.224	2.40	-0.775	-1.79	0.385	0.412		x	
09.05	7.97	1.37	0.238	-0.547	0.0866	2.24	-1.06	-1.36	0.468	0.404		x	
09.06	7.59	1.28	-0.198	-0.722	-0.1125	2.33	-1.42	-1.06	0.595	0.404		x	
12.10	7.77	1.34	0.670	-0.0219	0.196	2.68	-0.084	-1.80	0.255	0.400		x	
12.11	7.65	1.56	0.213	0.396	-0.116	2.92	-0.323	-2.05	-0.660	0.392		x	
12.12	7.51	1.41	-0.419	0.426	-0.429	1.87	-2.82	-2.12	0.928	0.400		x	
12.13	7.54	1.26	-0.536	0.350	-0.775	1.24	-3.89	-2.37	1.40	0.400		x	
14.10	8.11	1.215	0.888	-0.333	0.0897	2.97	-0.226	-2.17	-0.165	0.384		x	
14.11	7.83	1.26	0.0077	-0.168	-0.289	2.69	-2.22	-1.19	2.18	0.384		x	
14.12	7.75	1.00	-0.270	-0.414	-0.631	3.04	-4.92	-0.856	3.05	0.384		x	
14.13	7.75	0.798	-0.0056	-0.801	-1.01	3.75	-5.91	-1.05	3.00	0.384		x	
16.8	7.84	1.28	0.558	-0.712	0.435	1.06	-1.71	-0.586	2.15	0.381		x	
16.9	7.83	0.911	0.924	0.0515	0.260	0.923	-0.006	-0.797	0.541	0.384		x	
16.10	7.73	0.852	0.841	0.556	0.115	0.718	-0.377	-0.833	0.823	0.384		x	

$\theta_{0.7R} = 5°$

TABLE IX - (continued) - FOURIER COEFFICIENTS OF THE FLAP BENDING STRESS AT 0.45 R - (TRACE 19)

Values in hectobars)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN P.T.	σ_0	σ_1	σ'_1	σ_2	σ'_2	σ_3	σ'_3	σ_4	σ'_4	μ		HARM. NASA	ANAL G.D
18.18	7.52	1.10	0.753	-0.235	0.165	2.12	-0.400	-2.23	0.318	0.404			x
18.11	7.78	1.06	0.635	-0.165	0.165	2.12	-1.10	-1.76	0 329	0.404			x
18.12	7.52	1.01	0.329	0	0.235	1.06	-2.61	-1.17	1.64	0.402			x
19.8	7.47	1.235	0.604	-0.122	0.302	1.80	-0.720	-1.894	0.898	0.405		x	
19.9	7.388	1.43	0.343	0.133	0.431	0.975	0.151	-0.708	1.295	0.402		x	
19.10	7.368	1.382	-0.342	0.357	0.184	0.413	-0.690	1.13	0.966	0.404		x	
19.11	7.43	1.203	-0.339	0.344	0.230	0.871	0.165	1.12	0.788	0.405		x	
13.14	8.025	1.33	0.588	-0.108	0.203	1.36	-0.417	-1.55	1.26	0.400		x	
13.15	8.15	1.34	0.457	-0.192	0.892	1.61	-2.34	-2.25	0.182	0.400		x	
13.76	7.99	1.30	0.393	-0.209	1.14	1.76	-2.51	-2.36	-0.406	0.400		x	
13.17	7.91	1.21	0.331	-0.393	1.29	1.55	-2.65	-2.43	-0.408	0.400		x	
16.12	8.114	0.981	1.065	0.294	-0.166	0.662	0.294	0.247	0.726	0.381		x	
16.13	8.31	0.639	1.41	0.603	-0.177	0.239	0.895	0.277	0.367	0.381		x	
9.7	8.31	1.68	0.349	0.074	0.455	1.87	-0.502	-1.20	0.927	0.404		x	
9.8	8.36	1.44	0.441	-0.241	0.226	2.06	-0.680	-1.51	1.22	0.420		x	
9.9	8.53	1.43	0.558	-0.739	-0.013	1.89	-1.49	-1.50	1.25	0.420		x	
9.10	8.35	1.17	0.0841	-0.784	0.0274	1.16	-1.31	-0.461	1.56	0.420			

GIRAVIONS DORAND

TABLE IX.2

FOURIER COEFFICIENTS OF THE JET FLAP DEFLECTION AFTER THE PHASE CORRECTION

$$\delta_{corrected} = \delta\,(\Psi - \Delta\Psi)$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN		$\Delta\Psi$		δ_0	δ_1	δ_1'	δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'	
		degree		degree	degree	degree	degree	degree	degree	degree	degree	degree	
9.03		0		23.4	5.15	-9.86	0.356	0.303	1.640	-0.159	-0.212	0.430	
9.04		-2		25.9	4.155	-8.81	-1.841	-0.670	0.530	0.005	-0.362	-0.101	
9.05		0		23.9	4.96	-8.76	-4.58	-2.7	-0.163	0.054	-0.381	-0.738	
9.06		-3		21.8	1.926	-14.26	-9.175	0.723	0.306	1.035	-1.097	0.371	
12.10		-1		22.2	3.748	-3.006	0.806	-0.659	0.304	-0.248	-0.248	0.156	
12.11		0		22.0	7.74	-7.96	2.21	-4.40	-0.375	-1.78	0.161	1.36	
12.12		0		23.8	5.87	-13.98	-0.361	-7.63	-3.08	-1.83	1.72	1.04	
12.13		0		23.8	5.54	-15.5	-0.81	-9.78	-4.08	-2.12	2.12	0.98	
14.10		-4		24.7	2.9	-2.819	-0.159	-1.129	0.548	0.221	0.235	-0.067	
14.11		0		24.9	3.18	-9.63	-2.17	-4.2	0.958	-0.979	0.615	-1.18	
14.12		0		24.8	0.651	-9.94	-4.56	-7.0	1.30	-2.60	0.977	-2.28	
14.13		0		25.4	0.22	-10.32	-3.50	-10.330	2.95	-2.315	1.82	-2.13	
16.08		10		23.3	-0.505	0.036	-0.235	0.458	0.059	-4.048	0.129	-0.056	
16.09		-2		22.6	-1.898	0.378	3.466	0.820	-0.786	-0.002	-0.795	-0.537	
16.10		-5		21.8	-2.784	0.419	6.856	-0.277	-1.639	0.915	-1.676	-0.518	

GIRAVIONS DORAND

TABLE X.1

Page 67

Doc' DH.2011.E5

FOURIER COEFFICIENTS OF THE JET FLAP DEFLECTION
AFTER THE PHASE CORRECTION.

$$\delta_{corrected} = \delta(\Psi - \Delta\Psi)$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN		$\Delta\Psi$		δ_0	δ_1	δ'_1	δ_2	δ'_2	δ_3	δ'_3	δ_4	δ'_4	
		degree		degree	degree	degree	degree	degree	degree	degree	degree	degree	
18.10		-5		23.3	0.713	-1.207	0.339	0.520	0.	0.	0.	0.	
18.11		-4		24.3	0.665	-2.172	0.	0.	0.149	-0.865	0.157	-0.045	
18.12		7		24.2	0.497	-4.05	0.	0.	0.094	-2.063	-0.215	-0.115	
19.08		2		20.7	2.021	-1.721	-0.023	0.325	0.119	0.423	-0.289	-0.287	
19.09		2		21.1	4.231	-4.265	0.	0.	-0.478	1.428	-0.232	-0.691	
19.10		15		22.3	2.763	-6.527	0.282	0.163	-0.980	1.325	-0.163	-0.282	
19.11		0		22.7	0.489	-7.99	0.163	0.	2.28	342	-0.733	-0.326	
13.14		0		27.3	3.27	-3.89	-0.15	0.47	0.93	0	-0.31	0.0	
13.15		0		28.6	6.07	-9.95	-2.34	4.2	1.55	2.8	0.	1.71	
13.16		0		28.6	4.82	-12	-4.04	7.31	2.34	-3.42	0.62	2.49	
13.17		0		27.9	4.82	-12.43	-5.75	9.17	3.57	-3.89	0.310	2.80	
16.12		0		27.2	-1.79	0.	3.1	-0.98	-0.163	0.652	-0.489	0.652	
16.13		0		27.4	-2.77	0.326	6.6	0.	-1.47	0.98	-1.63	-0.652	
9.07		2		27.1	6.305	-7.775	0.302	0.348	1.003	0.597	-0.218	0.380	
9.10		2		30.6	4.008	-11.917	-6.413	-4.047	-0.043	0.405	-0.671	-1.084	

GIRAVIONS DORAND

TABLE X.2

Doc' DH 2011 D.E5

FOURIER COEFFICIENTS OF THE FLAP BENDING STRESS AT 0,45R, AFTER THE PHASE CORRECTION

$$\sigma_{corrected} = \sigma\ (\Psi - \Delta\Psi)$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN		$\Delta\Psi$		σ_0	σ_1	σ_1'	σ_2	σ_2'	σ_3	σ_3'	σ_4	σ_4'	
		degree		hb	hb	hb	hb	hb	hb	hb	hb	hb	
9.03		0		7.93	1.64	0.025	0.173	0.497	2.38	-0.567	-1.27	0.641	
9.04		-2		8.25	1.473	0.338	-0.209	0.240	2.306	-1.022	-1.719	0.630	
9.05		0		7.97	1.37	0.238	-0.547	0.087	2.24	-1.060	-1.360	0.468	
9.06		-3		7.59	1.268	-0.265	-0.73	-0.036	2.079	-1.767	-0.913	0.802	
12.10		-1		7.77	1.351	0.647	-0.015	0.197	2.672	-0.224	-1.778	0.38	
12.11		0		7.65	1.56	0.213	0.396	-0.116	2.920	-0.323	-2.05	-0.66	
12.12		0		7.51	1.41	-0.419	0.426	-0.429	1.870	-2.82	-2.12	0.928	
12.13		0		7.54	1.26	-0.536	-0.350	-0.775	1.24	-3.09	-2.37	1.4	
14.10		-4		8.11	1.274	0.801	-0.317	0.135	2.858	-0.839	-2.131	0.440	
14.11		0		7.83	1.26	0.008	-0.168	-0.289	2.690	-2.22	-1.19	2.16	
14.12		0		7.75	1.000	-0.27	-0.414	-0.631	3.040	-4.92	-0.856	3.05	
14.13		0		7.75	0.796	-0.006	-0.801	-0.01	3.75	-5.91	-1.05	3.0	
16.08		·10		7.84	1.164	0.772	-0.215	0.384	1.775	-0.951	-1.831	1.27	
16.09		-2		7.83	0.943	0.892	0.072	0.256	0.917	-0.102	-0.714	0.647	
16.10		-5		7.733	0.922	0.764	0.568	0.017	0.791	0.178	-0.501	1.058	

GIRAVIONS DORAND

TABLE XI.1

Page 69

Doc' DH.2011D.E5

FOURIER COEFFICIENTS OF THE FLAP BENDING STRESS

AT 0,45 R , AFTER THE PHASE CORRECTION

$$\sigma_{corrected} = \sigma\,(\Psi - \Delta\Psi)$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN		$\Delta\Psi$		σ_0	σ_1	σ_1'	σ_2	σ_2'	σ_3	σ_3'	σ_4	σ_4'	
		degree		hb	hb	hb	hb	hb	hb	hb	hb	hb	
18.10		-5		7.52	1.161	0.654	-0.203	0.203	1.944	-0.935	-1.987	1.062	
18.11		-4		7.78	1.102	0.560	-0.14	0.186	1.845	-1.517	-1.601	0.801	
18.12		7		7.52	0.962	0.450	-0.057	0.228	1.925	-2.057	-1.803	0.899	
19.08		2		7.47	1.213	0.647	-0.143	0.293	1.865	-0.528	-2.001	0.626	
19.09		2		7.388	1.417	0.393	0.103	0.439	0.954	0.252	-0.881	1.184	
19.10		15		7.368	1.423	0.027	0.217	0.338	0.780	-0.196	-0.272	1.462	
19.11		0		7.43	1.203	-0.339	0.344	0.23	0.871	0.165	1.12	0.788	
13.14		0		8.025	1.33	0.588	-0.108	0.203	1.36	-0.417	-1.55	1.26	
13.15		0		8.15	1.34	0.457	-0.192	0.892	1.61	-2.34	-2.25	0.182	
13.16		0		7.99	1.30	0.393	-0.209	1.14	1.76	-2.51	-2.36	-0.406	
13.17		0		7.91	1.21	0.331	-0.303	1.29	1.55	-2.65	-2.43	-0.408	
16.12		0		8.114	0.981	1.065	0.294	-0.166	0.663	0.294	0.247	0.726	
16.13		0		8.31	0.639	1.41	0.603	-0.177	0.239	0.895	0.277	0.367	
9.07		2		8.31	1.667	0.407	0.042	0.459	1.912	-0.304	-1.317	0.751	
9.10		2		8.35	1.166	0.125	-0.784	-0.028	1.291	-1.182	-0.674	1.481	

GIRAVIONS DORAND

TABLE XI.2

Doc' DH.2011D.E5

Page 70

PHOTOGAY-LYON

	δ_0	δ_1	δ_1'	δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'	1	α_S
σ_0	12	3	2	0	-2	2	-1	-17	4	530	4
σ_1	0	8	0	0	1	1	6	3	2	137	3
σ_1'	4	2	9	-1	0	-1	-6	13	4	-39	-3
σ_2	-4	0	-5	13	2	-4	4	6	1	21	-4
σ_2'	3	5	0	1	14	-1	1	8	-4	1	5
σ_3	-1	10	10	-7	17	36	-25	-27	21	395	18
σ_3'	3	20	11	8	3	-12	48	-59	29	-152	-1
σ_4	-4	-16	-14	11	-2	13	32	-15	-22	-248	-16
σ_4'	-1	-8	-5	0	5	-5	5	57	-72	39	-7

TABLE XII. VALUE OF 100 × T FOR FIXED STICK CONDITIONS

(σ in hbar , δ in degrees)

RUN	α_S degrees	Error %	STRESS REDUCTION Real cam %	Optimal cam 'B' type %	Ideal cam 'B' type %
9.03	-10	5.6	-18	24	26
9.04	-10	6.	-27	23	27
9.05	-10	7.9	-18	21	25
9.06	-10	8.3	-17	36	68
12.10	-10	3.9	-9	14	24
12.11	-10	6.8	-11	11	18
12.12	-10	3.9	-61	28	36
12.13	-10	4.2	-70	32	45
14.10	-10	9.9	-26	16	27
14.11	-10	7.6	-80	33	34
14.12	-10	5.	-154	42	54
14.13	-10	5.1	-190	43	59
16.08	-10	4.7	-4	32	38
16.09	-10	8.3	42	40	43
16.10	-10	10.	41	45	47
18.10	-10	6.	-8	27	34
18.11	-10	4.9	-2	28	34
18.12	-10	6	-25	34	37
19.08	-10	7.1	0	23	29
19.09	-10	7.	13	14	21
19.10	-10	8.7	5	26	28
19.11	-10	8.9	12	42	48
9.07	-12	6.9	-5	14	21
9.10	-12	7.8	-34	26	36
13.14	-15	8.6	-20	16	20
13.15	-15	8.7	-69	10	24
13.16	-15	6	-92	3	39
13.17	-15	5.3	-98	3	42
16.12	-15	9.	32	25	43
16.13	-15	10.	25	27	49
9.07	-12	6.9	-5	14	21
9.10	-12	7.8	34	26	36
Averages		6.9		25	36

TABLE XIII. CORRELATION ANALYSIS ON 30 RUNS

FIXED STICK CONDITIONS

$\mu = 0.4$; $\theta_{0.7} = 5°$; $\Omega = 250$ r.p.m

	$10^3 C_{LR}/\sigma$	$10^3 C_{XR}/\sigma$	$10^3 C_Y/\sigma$	δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'	1	α_s
σ_0	3	-1	1	0	1	1	2	-5	3	267	-23
σ_1	1	2	-11	0	5	-2	6	10	1	49	3
σ_1'	2	-14	2	0	-3	0	-2	-13	7	-440	-36
σ_2	-2	8	-1	12	4	-4	2	6	0	286	19
σ_2'	0	0	-5	0	14	-2	1	10	-3	12	2
σ_3	4	-11	-15	-5	-13	32	-20	-18	18	-230	-12
σ_3'	2	-6	-16	11	6	-14	50	-52	31	-396	-17
σ_4	-6	21	27	11	-5	18	27	-21	-20	659	42
σ_4'	0	5	3	0	7	-7	5	60	-78	71	1

TABLE XIV - VALUE OF 100 T FOR FIXED FLIGHT CONDITIONS

(σ in h bar , δ in degrees)

RUN	α_s degrees	Error %	STRESS REDUCTION Real cam %	Optimal cam % 'B' type	Ideal cam 'B' type %
9-03	-10	7.6	8.7	29	44
9-04	-10	3.3	-7	35	45
9-05	-10	12.7	-27	49	50
9-06	-10	13.9	-27	46	66
12-10	-10	12.6	-24	39	45
12-11	-10	12.6	-21	39	52
12-12	-10	4.9	-45	39	62
12-13	-10	7.8	-45	37	61
14-10	-10	13.5	-28	34	46
14-11	-10	10.8	-80	50	57
14-12	-10	8.2	-128	44	52
14-13	-10	6.3	-173	46	55
16-08	-10	5.5	3	28	46
16-09	-10	8.8	43	32	47
16-10	-10	14.2	39	36	48
18-10	-10	5.2	-5	28	44
18-11	-10	3.4	-7	36	46
18-12	-10	8.	-15	33	45
19-08	-10	13.	-22	41	47
19-09	-10	10.9	-17	51	51
19-10	-10	9.8	1	47	48
19-11	-10	16.	9	49	50
13-14	-15	7.8	-13	29	40
13-15	-15	7.1	-78	24	42
13-16	-15	4.5	-116	14	48
13.17	-15	4.8	-121	13	50
16.12	-15	8.5	27	24	42
16-13	-15	8	24	26	40
9.07	-12	5.3	-7	42	47
9-10	-12	10.4	-23	37	62
Averages		8.8		36.	49

TABLE XV. CORRELATION ANALYSIS ON 30 RUNS

FIXED FLIGHT CONDITIONS

$\mu = 0.4$; $\theta_{0.7} = 5°$; $\Omega = 250$ r.p.m

$\theta_{0.7R} = 5°$ $\mu = 0.4$

TABLE XVI - FOURIER COEFFICIENTS
OF THE VERTICAL BALANCE ARMS AND RESULTANT FZ

(5.1 Left aft ; 5.2 Right aft ; 5.3 Forward ; FZ = 5-1 + 5.2 + 5-3)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN, FT	GALVA	F_0	F_1	F'_1	F_2	F'_2	F_3	F'_3	F_4	F'_4			
		daN			daN	daN			daN	daN			
9-6	5.1	876			17.65	-167.5			126.2	2.94			
	5.2	880			-66.6	-14.472			184.9	34.75			
	5.3	149			247.2	-68.5			-166.9	149			
	FZ	1805			198.25	-250.472			144.2	186.69			
9.10	5.1	916			-102.9	+158.5			135.1	-11.75			
	5.2	870			327.5	-20.95			-133	-224			
	5.3	157.5			-149	-74.5			126.7	-41.7			
	FZ	1820			75.6	62.5			138.8	-277.45			
12-11	5-1	890			-259	52.9			97	174.2			
	5-2	778			-251.2	-110			60.8	237.5			
	5-3	213.5			247.2	98.4			160.9	-202.5			
	F-Z	1881.5			-263	41.3			318.7	206.2			
12-13	5-1	903			-138	217.8			247	-55.8			
	5-2	862			179.3	-205.2			289.5	52.1			
	5-3	137.9			149	-35.78			-164	-244.2			
	F-Z	1902.9			190.3	-23.18			372.5	-247.9			

GIRAVIONS DORAND

TABLE XVI.1

Doc' DH.2011 D.E5

$\theta_{0.7R} = 5°$ $\mu = 0.4$

TABLE XVI - FOURIER COEFFICIENTS OF THE VERTICAL BALANCE ARMS AND RESULTANT FZ. (Continued)

(5.1 Left aft ; 5.2 Right aft ; 5.3 Forward ; FZ = 5.1 + 5.2 + 5.3)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
RUN, PT	GALVA	F_o	F_1	F_1'	F_2	F_2'	F_3	F_3'	F_4	F_4'			
		daN			daN	daN			daN	daN			
13.17	5.1	890			-135.1	-79.4			147	91.1			
	5-2	636			-131.1	-125.3			128.2	57			
	5.3	197.3			301	-124.1			83.5	-110.2			
	F.Z	1431			34.8	-328.8			358.7	37.9			
14.13	5.1	893			-95.6	296			275	-125.5			
	5.2	922			-143	102.2			-286.2	-166.5			
	5.3	144			39.3	33.25			-311.8	-251.2			
	F.Z	1949			-199.3	431.45			-323	-543.2			
16.8	5-1	877.5			-320.5	205.9			167.8	-126.3			
	5-2	854			-406	-88.25			259	-91.25			
	5-3	298			384	-89.4			-284.5	-181.8			
	F.Z	2029.5			-342.5	28.35			142.3	-399.35			
16.10	5.1	843			-494	79.4			-167.5	5.88			
	5.2	801			-413	-251			194.2	26.5			
	5.3	326			304	65.6			-108.8	-202.5			
	F.Z	1970			-603	-106			-82.1	-170.1			

GIRAVIONS DORAND

TABLE XVI-2

e_{c7R} = [illegible] μ = 0.4

TABLE XVI. FOURIER COEFFICIENTS OF
THE VERTICAL BALANCE ARMS AND RESULTANT FZ (continued)

(5.1 Left aft ; 5.2 Right aft ; 5.3 Forward ; FZ = 5.1 + 5.2 + 5.3)

[illegible]		F_0	F_1	F_1'	F_2	F_2'	F_3	F_3'	F_4	F_4'
		DaN			DaN	daN			daN	daN
16.12	5.1	841			-314.2	297			48.5	-52.9
	5.2	765			-456	-38.22			117.8	-17.65
	5.3	-94.4			+411	-146			-220.1	-11.92
	F.Z	1511.6			-359.2	112.78			-53.8	-81.32
19.8	5.1	844			-314	113.6			194.1	47.8
	5.2	710			-336	-147.2			251	106
	5.3	263			366	27.2			-99.8	-293.5
	F.Z	1817			-314	-6.4			345.3	-139.7
19.11	5.1	809			-56.8	278			-104.8	-140.5
	5.2	811			-256	117.8			-197	-171
	5.3	188.5			149	-222			54.5	127.8
	F.Z	1808.5			-163.8	173.8			-247.3	-183.7
18.10	5.1	821			-380.	+41.9			+164.	132.
	5.2	770			-325.	-246.			+154.	244.
	5.3	330			+419.	+92.			+104.	-402
	F.Z	1921			-286.	-112.			422	-26.

	δ_0	δ_1	δ_1'	δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'	1	α_s
f_0	4	-2	1	0	-1	0	-2	-3	7	248	14
f_1	0	0	0	0	0	0	0	0	0	0	0
f_1'	0	0	0	0	0	0	0	0	0	0	0
f_2	0	1	-2	-3	1	-3	5	8	2	-55	-1
f_2'	0	1	0	2	-3	5	3	3	-7	-36	-3
f_3	0	0	0	0	0	0	0	0	0	0	0
f_3'	0	0	0	0	0	0	0	0	0	0	0
f_4'	1	6	4	-4	3	-9	0	10	2	50	3
f_4'	-3	1	2	-2	-4	2	-1	-19	18	42	-1

TABLE XVII. VALUE OF 100 T FOR VIBRATORY FORCES

(f IN TONS , δ IN DEGREES)

FIXED STICK CONDITIONS

	$10^3 C_{LR}/\sigma$	$10^3 C_{XR}/\sigma$	$10^3 C_Y/\sigma$	δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'	1	α_s
f_0	2	0	0	0	0	0	0	0	0	3	0
f_1	0	0	0	0	0	0	0	0	0	0	0
f_1'	0	0	0	0	0	0	0	0	0	0	0
f_2	0	4	-2	-2	4	-5	5	14	-3	-9	5
f_2'	0	0	-3	+2	-2	5	2	2	-9	-67	-3
f_3	0	0	0	0	0	0	0	0	0	0	0
f_3'	0	0	0	0	0	0	0	0	0	0	0
f_4	0	-8	-22	-6	1	-12	7	-9	-9	-530	-27
f_4'	-1	-5	-1	-3	-7	3	-4	-28	26	83	-1

TABLE XVIII. VALUE OF 100 T FOR VIBRATORY FORCES

(f IN TONS , δ IN DEGREES)

FIXED FLIGHT CONDITIONS

RUN	α_S deg	ERROR %	VIBRATORY FORCE REDUCTION Real cam %	optimal cam 'B' type %	Ideal cam 'B' type %
9.6	-10	0.3	-26	-5	100
9.10	-12	0.2	29	35	100
12.11	-10	0.1	1	36	100
12.13	-10	0.1	-58	26	100
13.17	-15	0.2	-16	22	100
14.13	-10	0.1	-99	39	100
16.8	-10	1.9	-7	50	100
16.10	-10	0.2	-23	51	100
16.12	-15	0.3	11	72	100
19.8	-10	0.4	5	40	100
19.11	-10	0.2	-20	67	100
18.10	-10	1.9	-10	50	100

TABLE XIX - CORRELATION ANALYSIS ON 12 RUNS FOR VIBRATORY FORCES - FIXED STICK CONDITIONS -

$\mu = 0.4$; $\theta_{0.7} = 5°$; $\Omega = 250$ r.p.m

RUN	α_S deg.	ERROR %	VIBRATORY FORCE REDUCTION		
			Real cam %	Optimal cam 'B' type %	Ideal cam 'B' type %
9.6	-10	1.3	-25	14	100
9.10	-12	1.2	54	19	100
12.11	-10	0.6	15	33	100
12.13	-10	0.1	28	34	100
13.17	-15	0.2	11	49	100
14.13	-10	0.7	-41	19	100
16.8	-10	1.7	-7	27	100
16.10	-10	0.5	-48	-3	100
16.12	-15	0.8	17	65	100
19.8	-10	2.6	-16	10	100
19.11	-10	0.6	-23	60	100
18.10	-10	3.7	6	21	100

TABLE XX - CORRELATION ANALYSIS ON 12 RUNS
FOR VIBRATORY FORCES
FIXED FLIGHT CONDITIONS.
$\mu = 0.4$; $\theta_{0.7} = 5°$; $\Omega = 250$ r.p.m

TABLE XXI. VALUE OF T FOR AERODYNAMICS COEFFICIENTS :
CLR/σ ; CXR/σ , CY/σ , CM/σ AND CRR/σ
(δ AND α_S IN DEGREES)

	δ_0	δ_1	δ_1'	δ_2	δ_2'	δ_3	δ_3'	δ_4	δ_4'	1	α_S
$10^3\ CLR/\sigma$	3.3	0	0.2	0	-1.8	1	-1.1	-4.6	1.8	107.8	8.1
$10^3\ CXR/\sigma$	0.2	0.2	-0.4	-0.1	-0.6	0.3	0	-1	0.4	-11.3	-1.2
$10^3\ CY/\sigma$	0.3	-0.3	0.1	-0.1	0.1	-0.2	-0.1	-0.2	-0.2	-0.9	0.4
$10^3\ CM/\sigma$	0.5	-0.5	0.1	0	-0.6	0	-0.8	-2	1.4	13.7	0.7
$10^5\ CRR/\sigma$	0	2.8	1.6	1.4	1.6	1.4	1.0	4.6	-6.4	-18.9	-4.6

STRESSES FOR RUN NUMBER 14.13

TABLE XXII - EXAMPLE OF THE PROGRAM OUTPUTS. (FIRST SHEET)

ALPHAS= -10.0

FOURIER COEFFICIENTS FOR STRESSES

OPTIMAL	COMPUTED	MEASURED	COMP.- MEAS.
0.806E 01	0.774E 01	0.775E 01	-0.110E-01
0.973E 00	0.875E 00	0.796E 00	0.787E-01
0.146E 00	-0.219E 00	-0.600E-02	-0.213E 00
0.661E 00	-0.565E 00	-0.801E 00	0.236E 00
0.434E-01	-0.103E 01	-0.101E 01	-0.229E-01
0.147E C0	0.373E 01	0.375E 01	-0.162E-01
-0.322E 00	-0.555E 01	-0.591E 01	0.356E 00
0.315E-01	-0.787E 00	-0.105E 01	0.263E 00
0.910E 00	0.310E 01	0.300E 01	0.963E-01

```
**************************************************************
* CORRELATION = 0.9974      QUADRATIC ERROR = 0.313E 00 *
*               RELATIVE ERROR =   5.1/100                  *
**************************************************************
```

STRESSES	COMPUTED	MEASURED	OPTIMAL
MAXIMUM	17.25 HECTOBARS	17.71 HECTOBARS	10.32 HECTOBARS
FOR PSI =	110. DEGREES	110. DEGREES	15. DEGREES
MINIMUM	-2.79 HECTOBARS	-3.16 HECTOBARS	6.19 HECTOBARS
FOR PSI =	160. DEGREES	165. DEGREES	250. DEGREES
PEAK-TO-PEAK	20.04 HECTOBARS	20.87 HECTOBARS	4.13 HECTOBARS

	RELATIVE DISTANCE TO IDEAL CAM	STRESSES REDUCTION	STRESSES PEAK-TO-PEAK
NO CAM	1.000	0.0	7.194
REAL CAM	2.337	-1.901	20.872
OPTIMAL CAM	0.572	0.426	4.126
IDEAL CAM	0.0	0.593	2.929

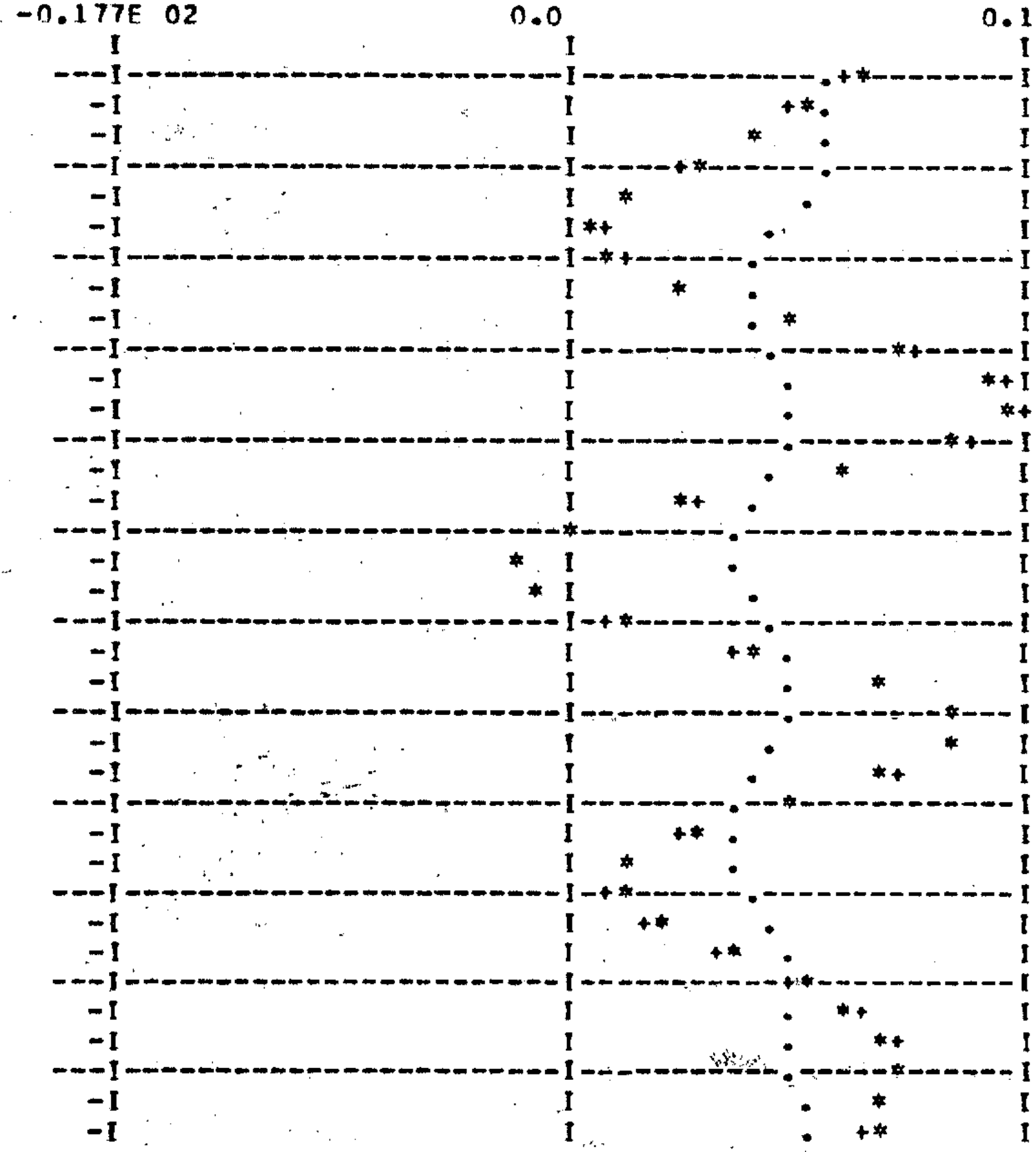
FLAP DEFLECTION FOR OPTIMAL CAM

MAX = 38.3 DEGREES MIN = 8.4 DEGREES
FOR
PSI = 315.2 DEGREES PSI = 100.1 DEGREES

TABLE XXIII - EXAMPLE OF THE PROGRAM OUTPUTS
(SECOND SHEET)

RUN 14.13

COMPARISON BETWEEN OPTIMAL (.), COMPUTED (*), AND MEASURED (+) VALUES



PSI	OPTIMAL	COMPUTED	MEASURED
0	0.988E 01	0.110E 02	0.104E 02
	0.103E 02	0.952E 01	0.885E 01
	0.103E 02	0.736E 01	0.676E 01
30	0.980E 01	0.473E 01	0.437E 01
	0.899E 01	0.227E 01	0.224E 01
	0.810E 01	0.884E 00	0.116E 01
60	0.743E 01	0.135E 01	0.185E 01
	0.720E 01	0.396E 01	0.455E 01
	0.741E 01	0.820E 01	0.880E 01
90	0.790E 01	0.129E 02	0.134E 02
	0.836E 01	0.163E 02	0.168E 02
	0.852E 01	0.173E 02	0.177E 02
120	0.825E 01	0.151E 02	0.155E 02
	0.764E 01	0.104E 02	0.107E 02
	0.694E 01	0.458E 01	0.471E 01
150	0.646E 01	-0.358E 00	-0.451E 00
	0.643E 01	-0.279E 01	-0.309E 01
	0.689E 01	-0.194E 01	-0.238E 01
180	0.764E 01	0.178E 01	0.135E 01
	0.836E 01	0.696E 01	0.670E 01
	0.874E 01	0.118E 02	0.118E 02
210	0.861E 01	0.145E 02	0.148E 02
	0.802E 01	0.146E 02	0.150E 02
	0.720E 01	0.121E 02	0.126E 02
240	0.650E 01	0.833E 01	0.856E 01
	0.619E 01	0.469E 01	0.460E 01
	0.638E 01	0.244E 01	0.205E 01
270	0.697E 01	0.218E 01	0.160E 01
	0.771E 01	0.370E 01	0.312E 01
	0.834E 01	0.624E 01	0.586E 01
300	0.868E 01	0.888E 01	0.880E 01
	0.874E 01	0.109E 02	0.111E 02
	0.865E 01	0.121E 02	0.124E 02
330	0.865E 01	0.125E 02	0.128E 02
	0.887E 01	0.124E 02	0.124E 02
	0.933E 01	0.119E 02	0.116E 02

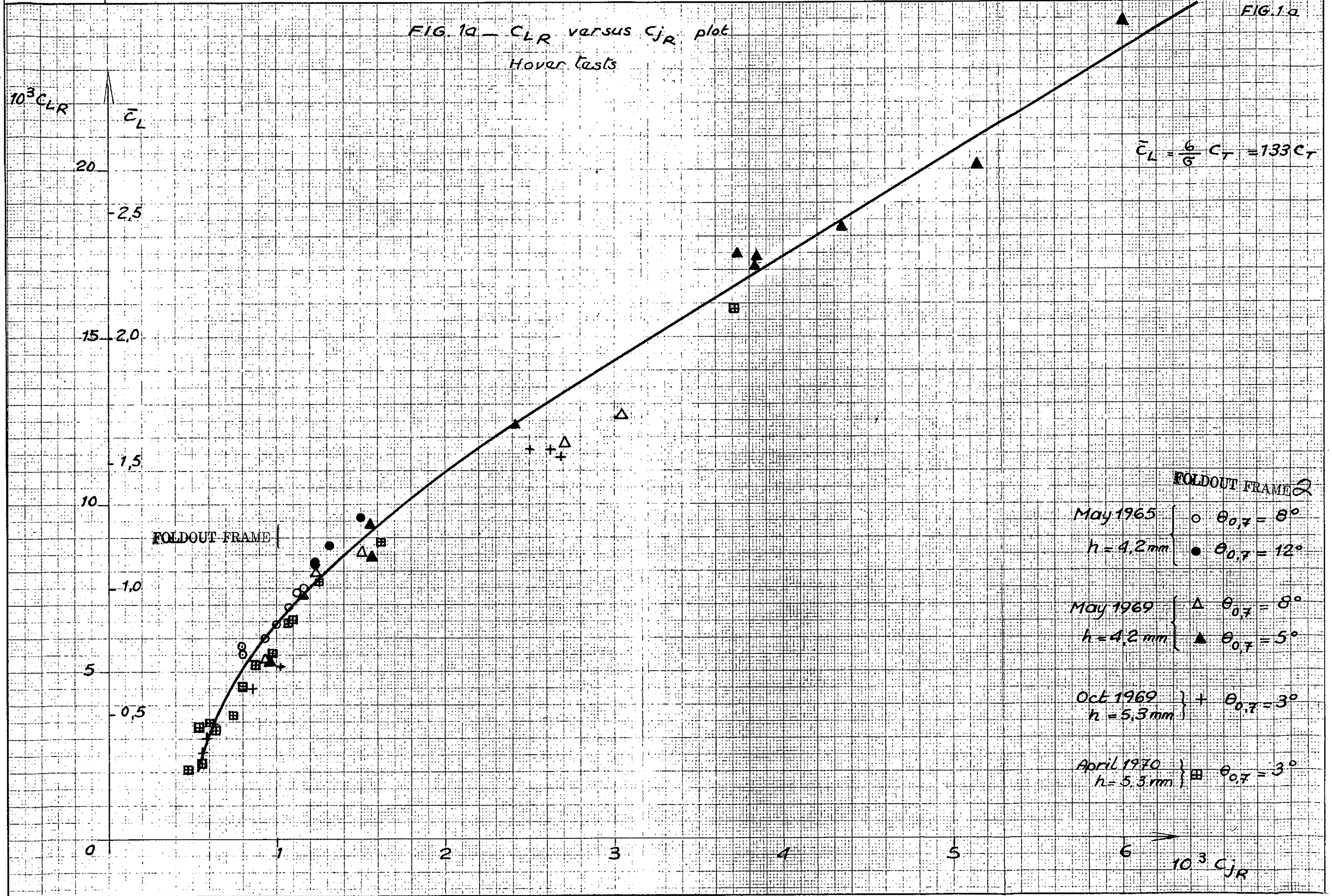
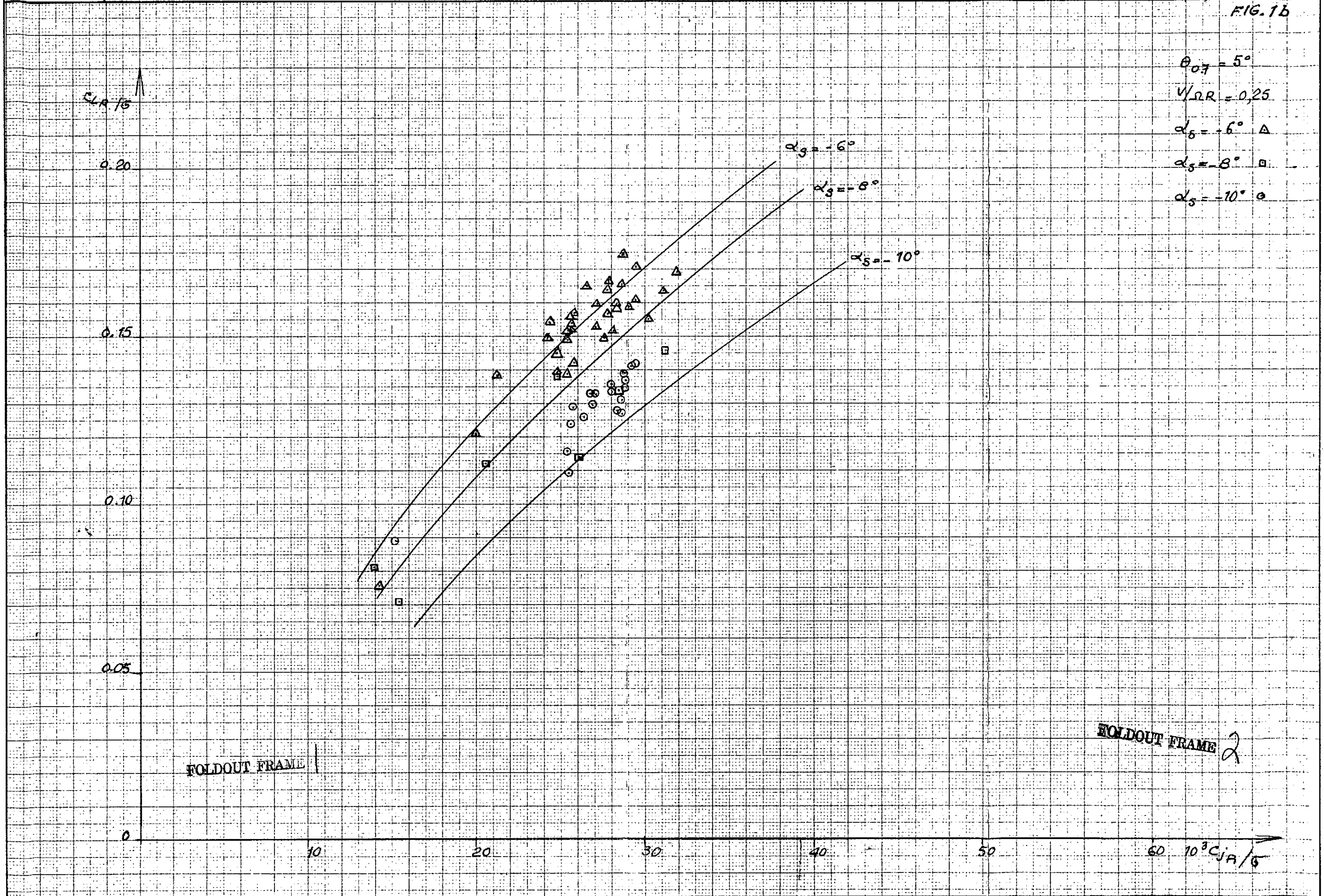


FIG. 1a
FIG. 1a — C_{L_R} versus C_{j_R} plot
Hover tests
$10^3 C_{L_R}$
$\bar{C}_L$
$\bar{C}_L = \frac{6}{\sigma} C_T = 133 C_T$
0
5
10
15
20
0,5
1,0
1,5
2,0
2,5
1
2
3
4
5
6
$10^3 C_{j_R}$
May 1965 $h = 4,2$ mm
○ $\theta_{0,7} = 8°$
● $\theta_{0,7} = 12°$
May 1969 $h = 4,2$ mm
△ $\theta_{0,7} = 8°$
▲ $\theta_{0,7} = 5°$
Oct 1969 $h = 5,3$ mm
+ $\theta_{0,7} = 3°$
April 1970 $h = 5,3$ mm
⊞ $\theta_{0,7} = 3°$
FOLDOUT FRAME
FOLDOUT FRAME 2

GIRAVIONS **DORAND**

FIG. 1. VARIATION OF LIFT COEFFICIENT WITH JET MOMENTUM COEFFICIENT

FIG. 1b



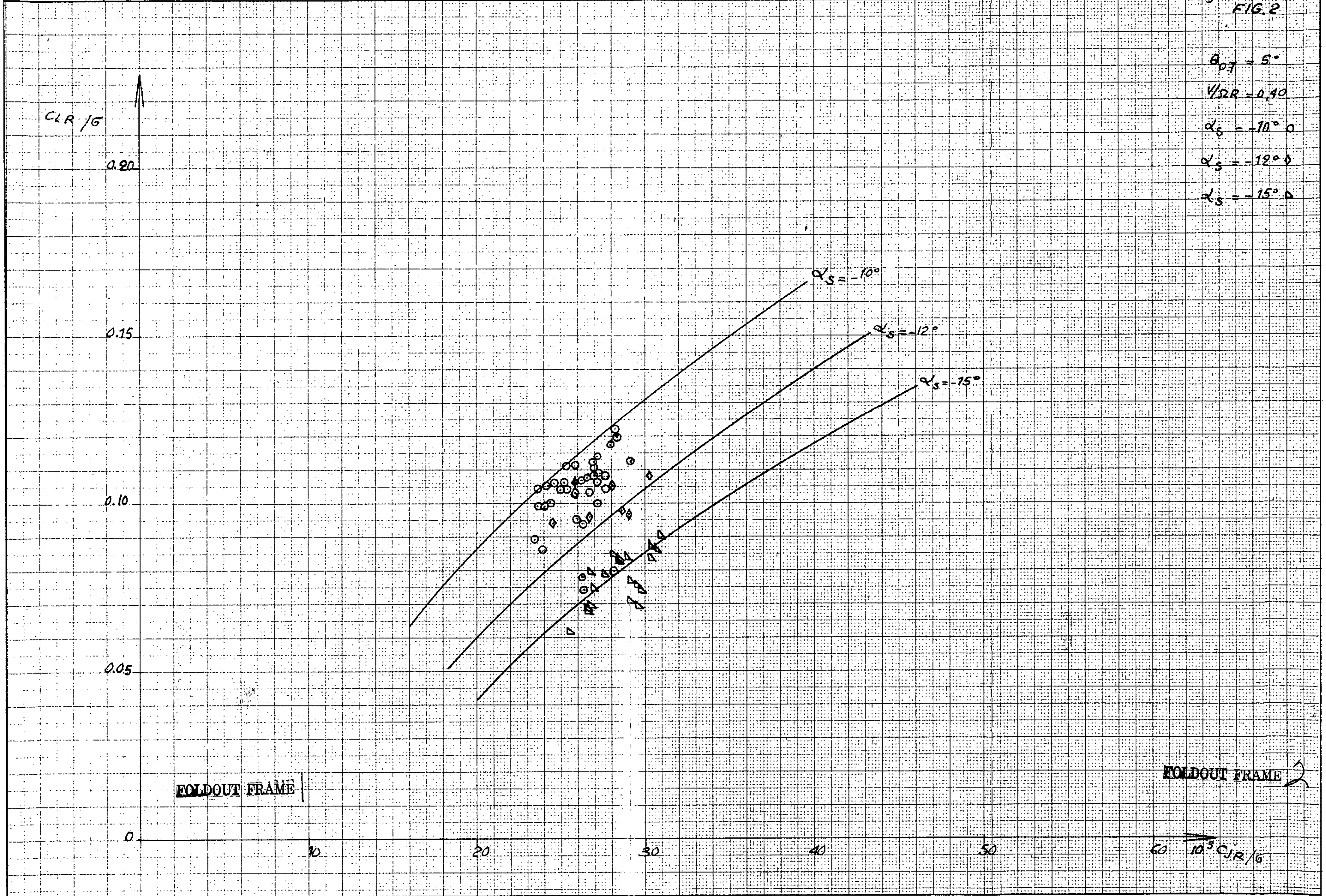
FOLDOUT FRAME 1

FOLDOUT FRAME 2

GIRAVIONS DORAND

FIG. 2. VARIATION OF LIFT COEFFICIENT WITH JET MOMENTUM COEFFICIENT

FIG. 2



FOLDOUT FRAME 1

FOLDOUT FRAME 2

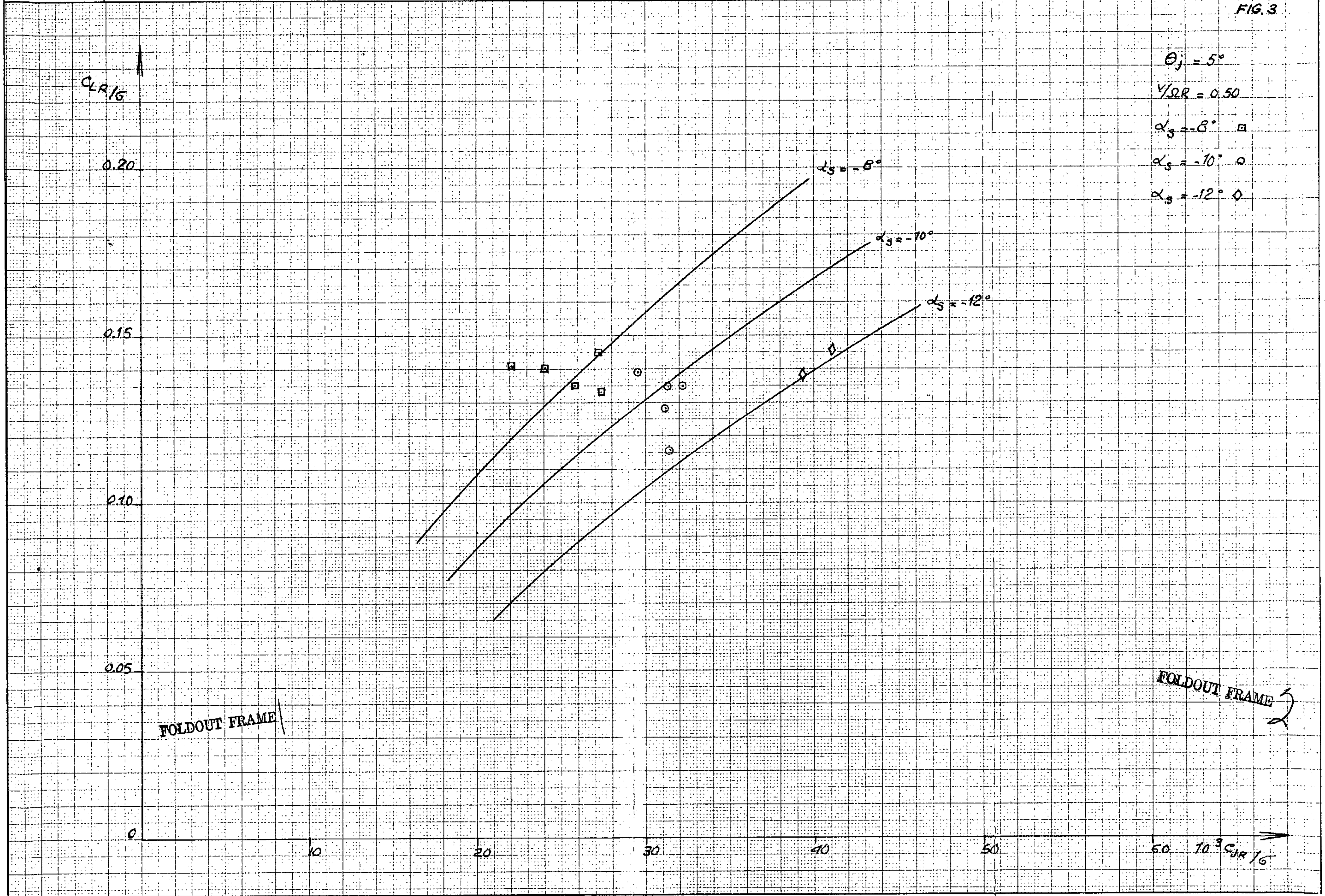
FOLDOUT FRAME 1

FOLDOUT FRAME 2

GIRAVIONS DORAND

FIG.3 . VARIATION OF LIFT COEFFICIENT WITH JET MOMENTUM COEFFICIENT

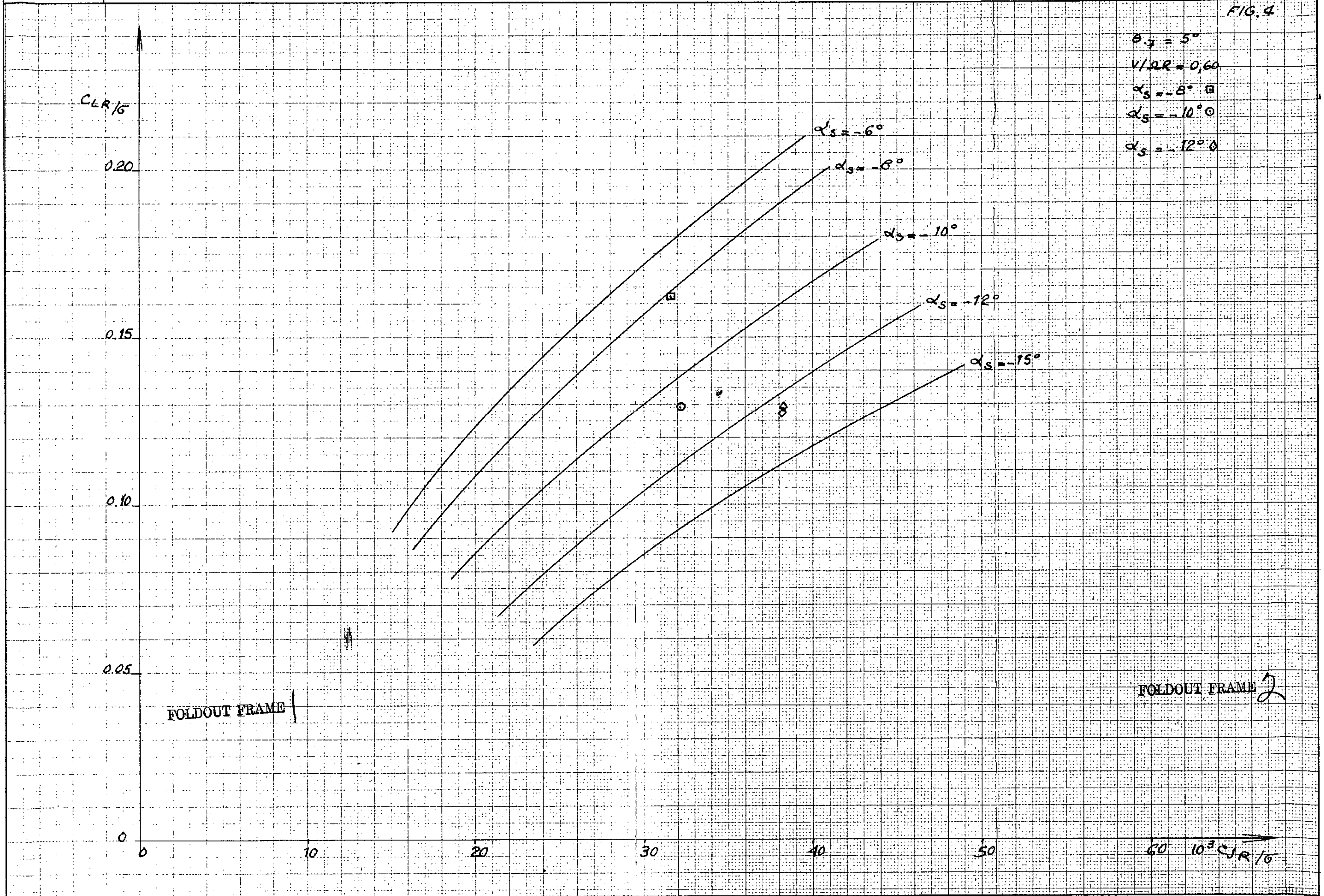
FIG. 3



FOLDOUT FRAME 1

FOLDOUT FRAME 2

FIG. 4 _ VARIATION OF LIFT COEFFICIENT WITH JET MOMENTUM COEFFICIENT

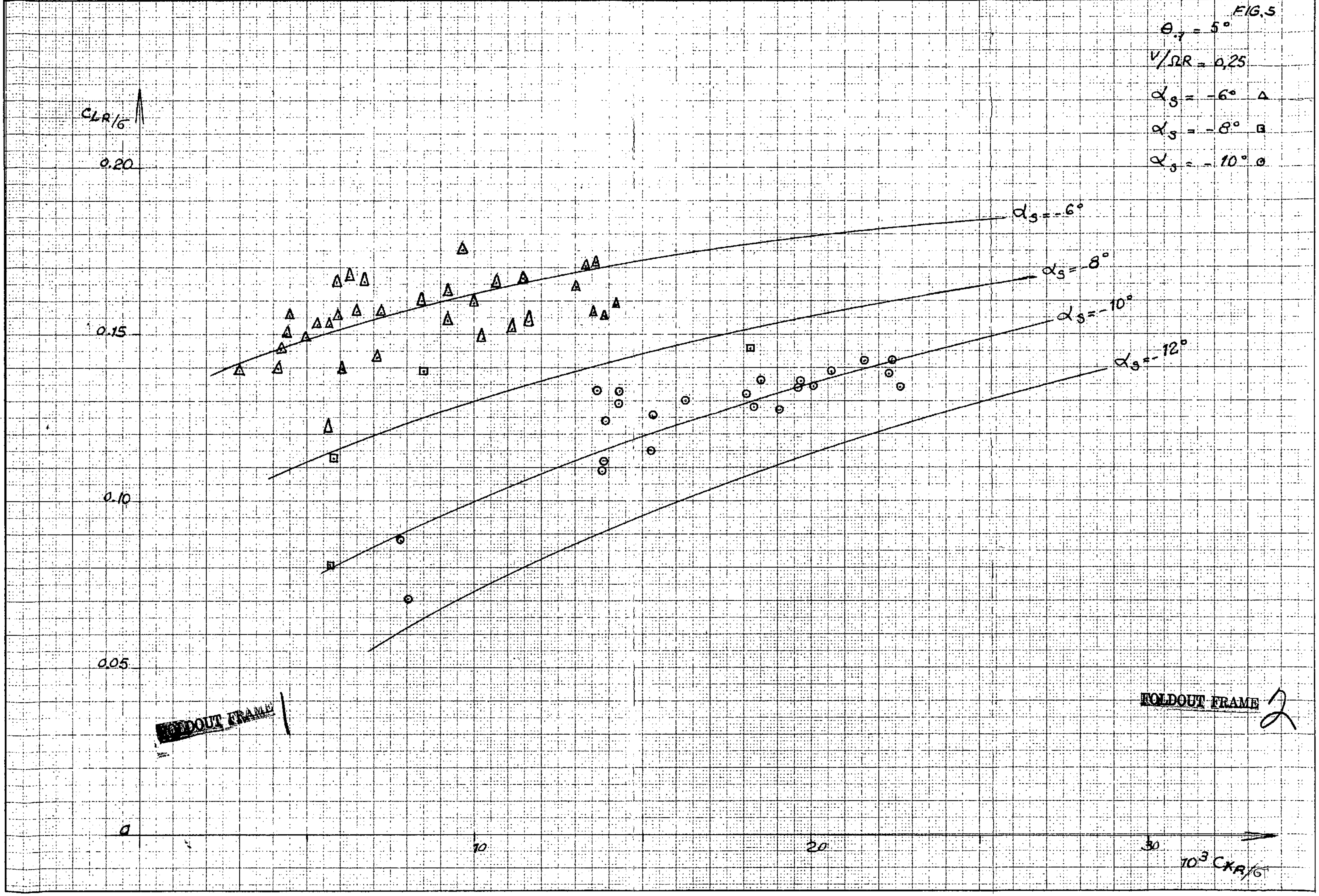


FOLDOUT FRAME 1

FOLDOUT FRAME 2

GIRAVIONS
DORAND

FIG.5 - VARIATION OF LIFT COEFFICIENT WITH PROPULSIVE FORCE COEFFICIENT



GIRAVIONS **DORAND**

FIG. 6 - VARIATION OF LIFT COEFFICIENT WITH PROPULSIVE FORCE COEFFICIENT

FIG. 6

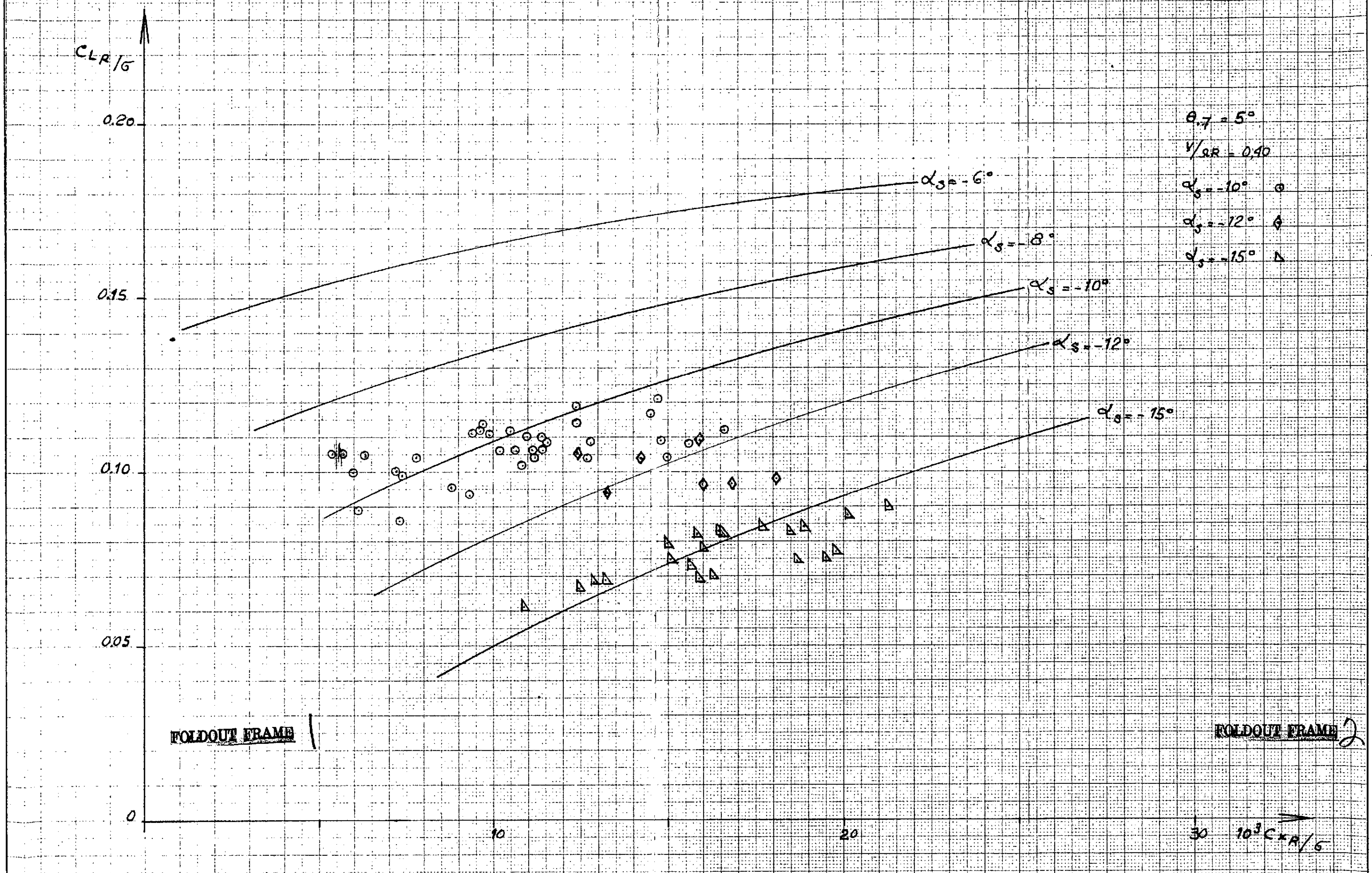
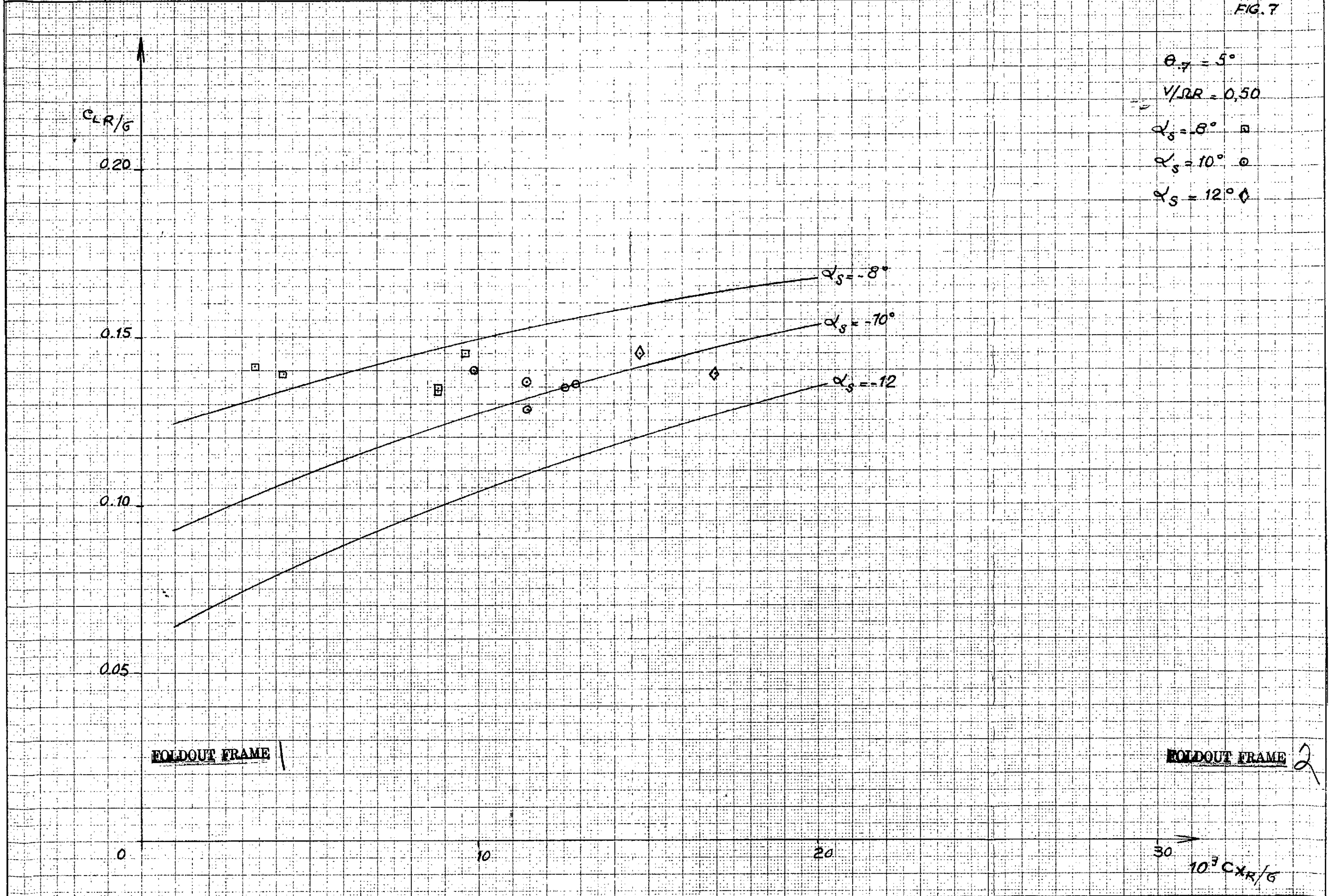


FIG. 7 - VARIATION OF LIFT COEFFICIENT WITH PROPULSIVE FORCE COEFFICIENT

FIG. 7



GIRAVIONS DORAND

FIG. 8 - VARIATION OF LIFT COEFFICIENT WITH PROPULSIVE FORCE COEFFICIENT

FIG. 8

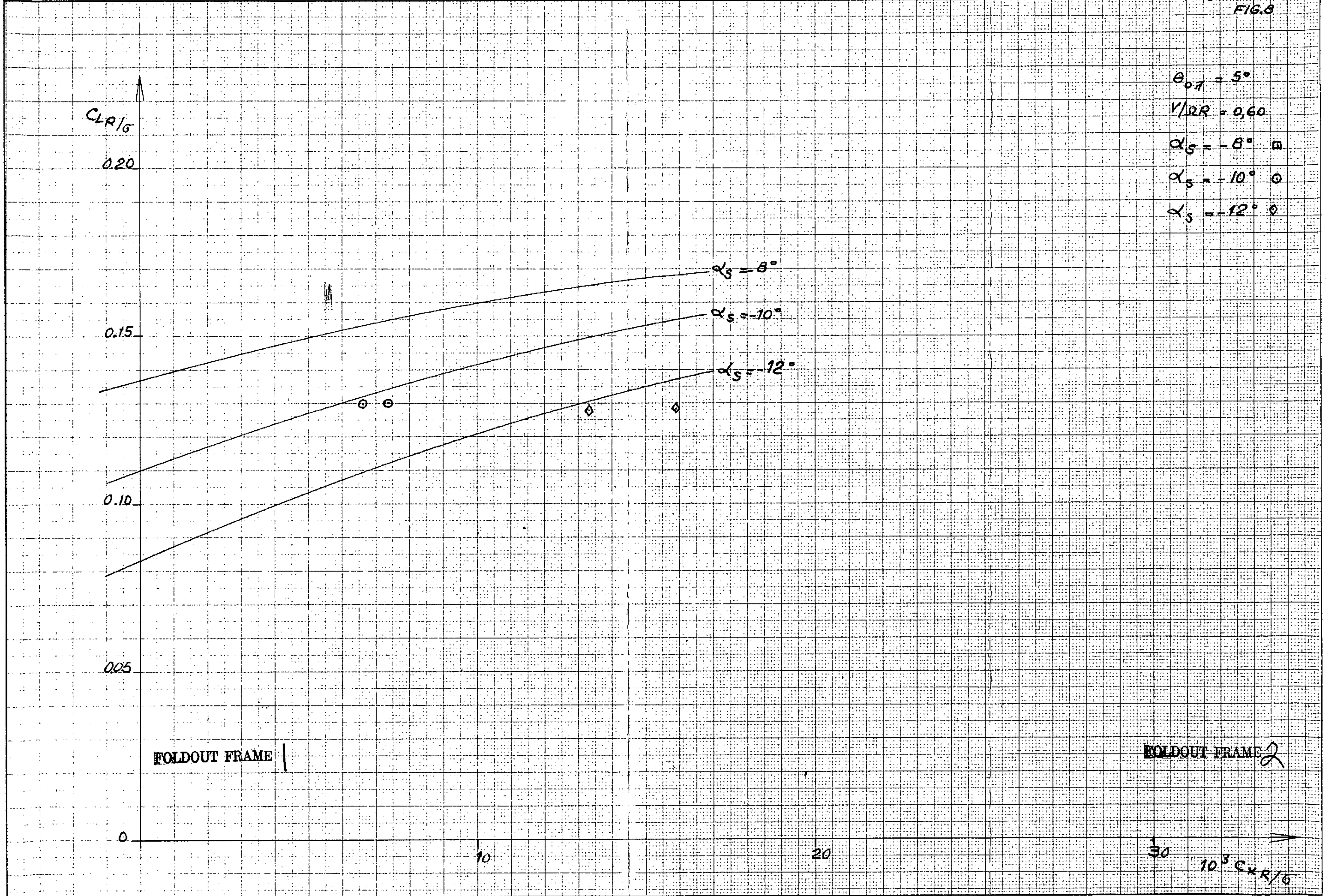
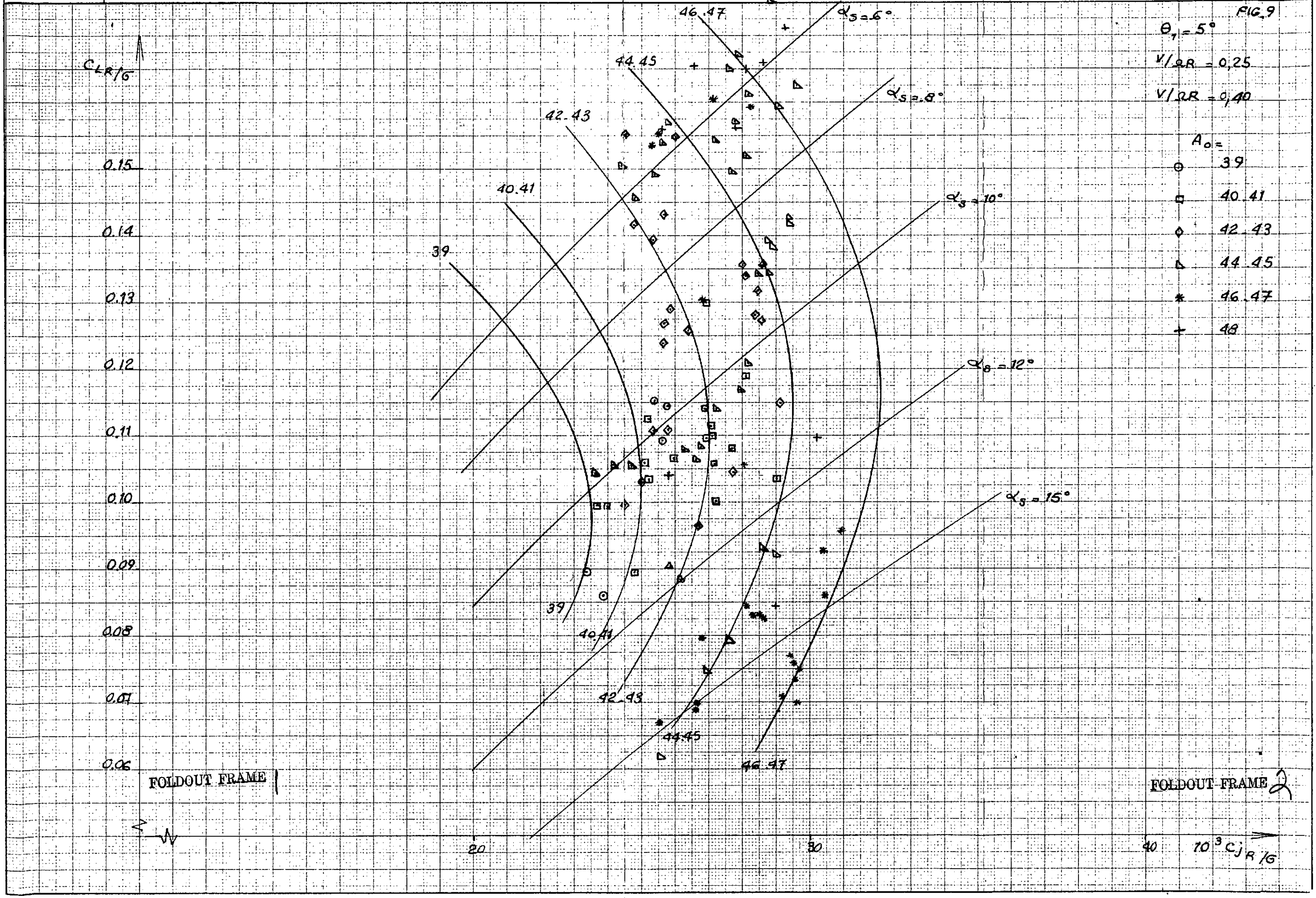


FIG. 9 _ VARIATION OF LIFT COEFFICIENT WITH JET MOMENTUM COEFFICIENT

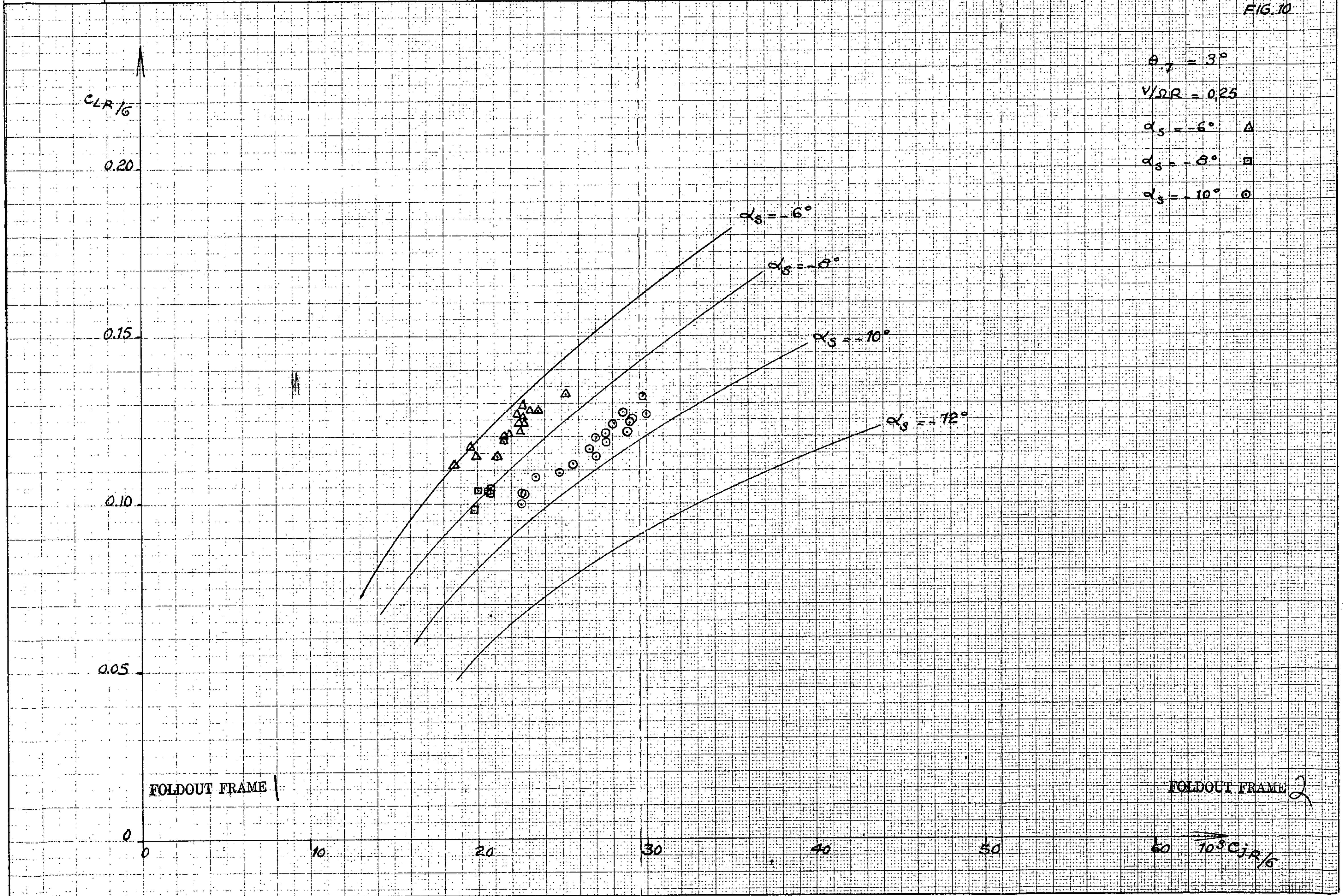


FOLDOUT FRAME 1

FOLDOUT FRAME 2

GIRAVIONS DORAND	FIG.10. VARIATION OF LIFT COEFFICIENT WITH JET MOMENTUM COEFFICIENT	Doc^t DH 2011 D.E5 Page: 95

FIG.10



FOLDOUT FRAME 1

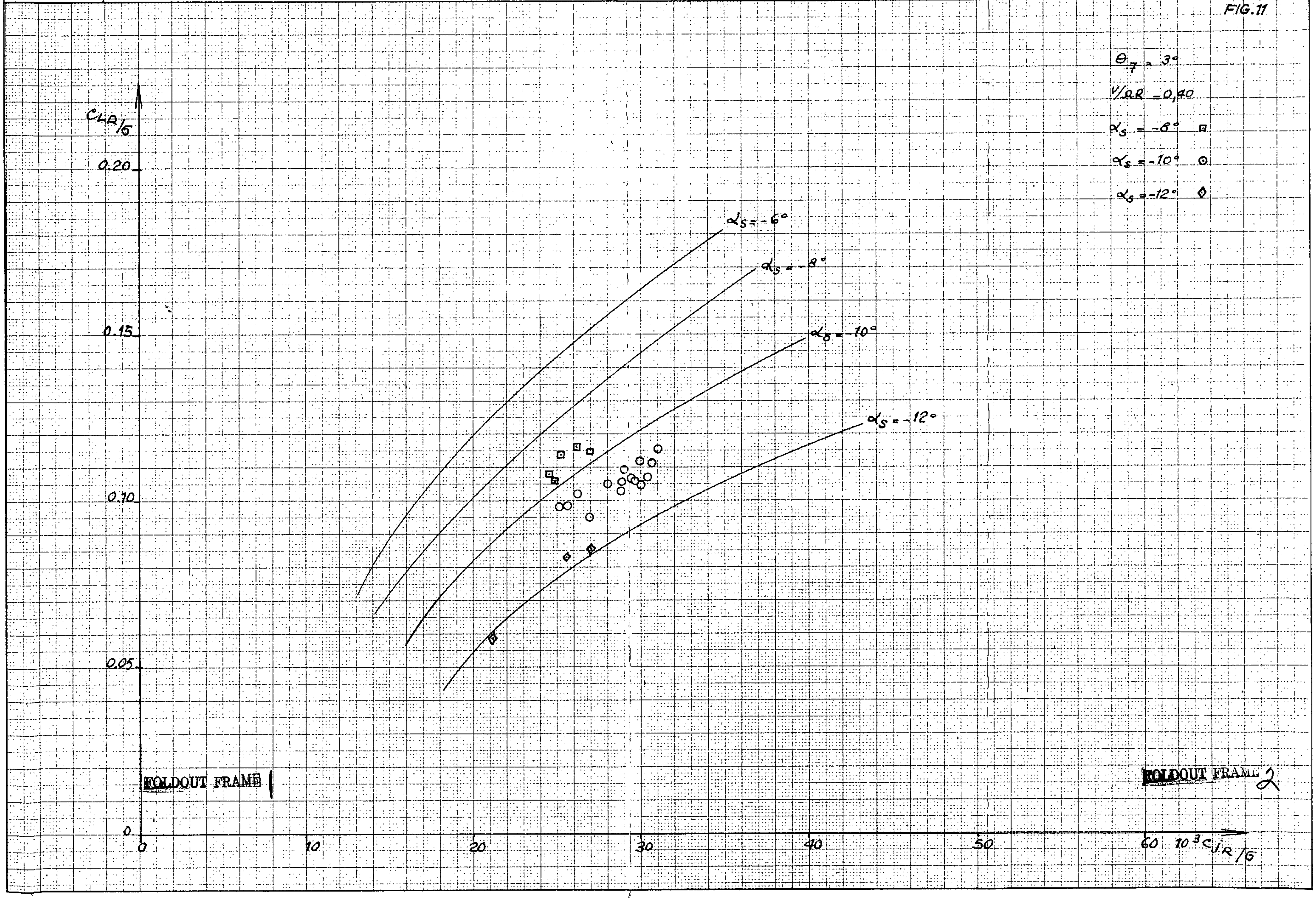
FOLDOUT FRAME 2

GIRAVIONS **DORAND**

FIG. 11. VARIATION OF LIFT COEFFICIENT WITH JET MOMENTUM COEFFICIENT.

Doc[t] DH 2011 D.ES

FIG. 11



FOLDOUT FRAME 1

FOLDOUT FRAME 2

GIRAVIONS **DORAND**

FIG. 12. VARIATION OF LIFT COEFFICIENT WITH JET MOMENTUM COEFFICIENT.

FIG. 12

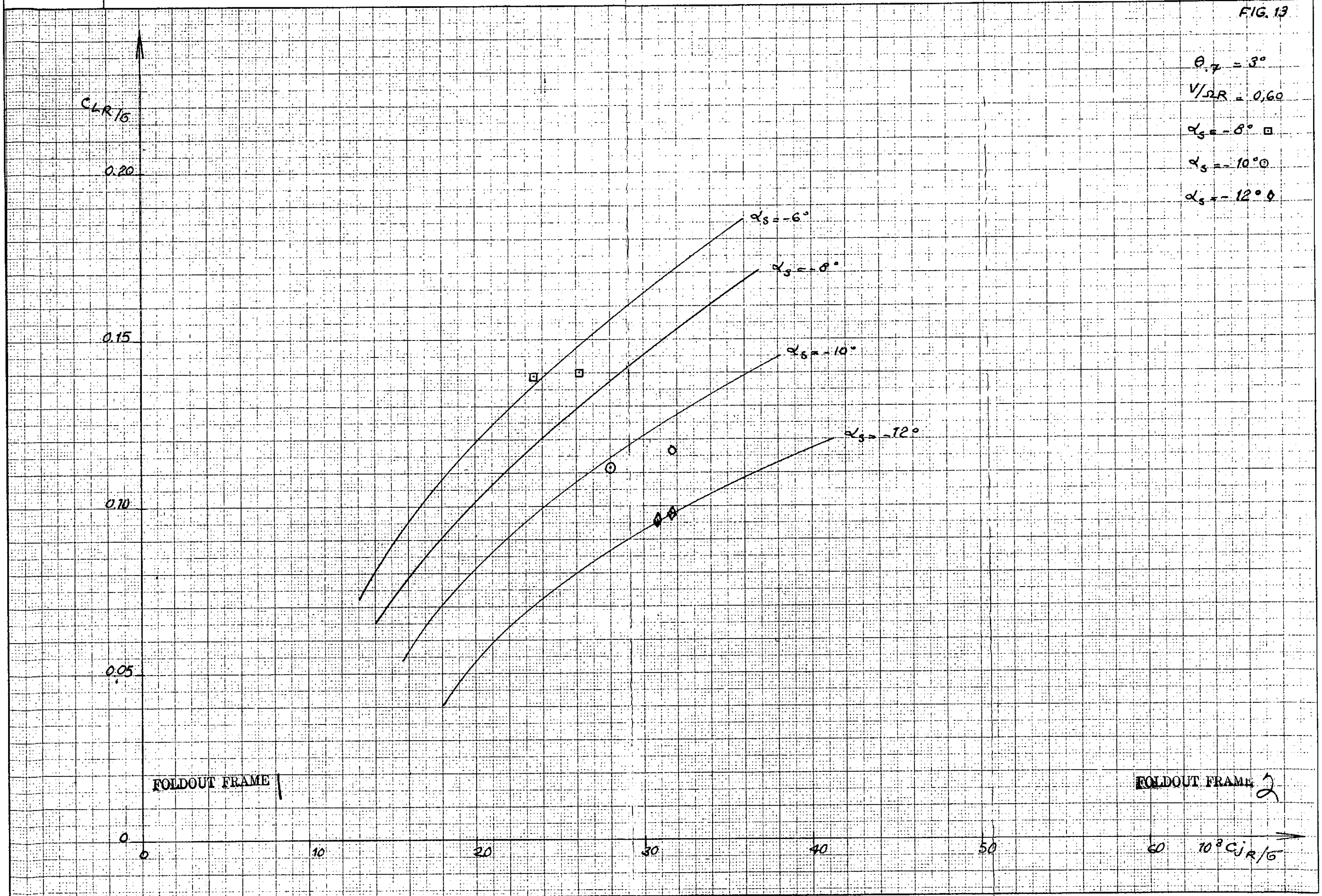
FOLDOUT FRAME 1

FOLDOUT FRAME 2

GIRAVIONS
DORAND

FIG.13. – VARIATION OF LIFT COEFFICIENT WITH JET MOMENTUM COEFFICIENT –

FIG. 13

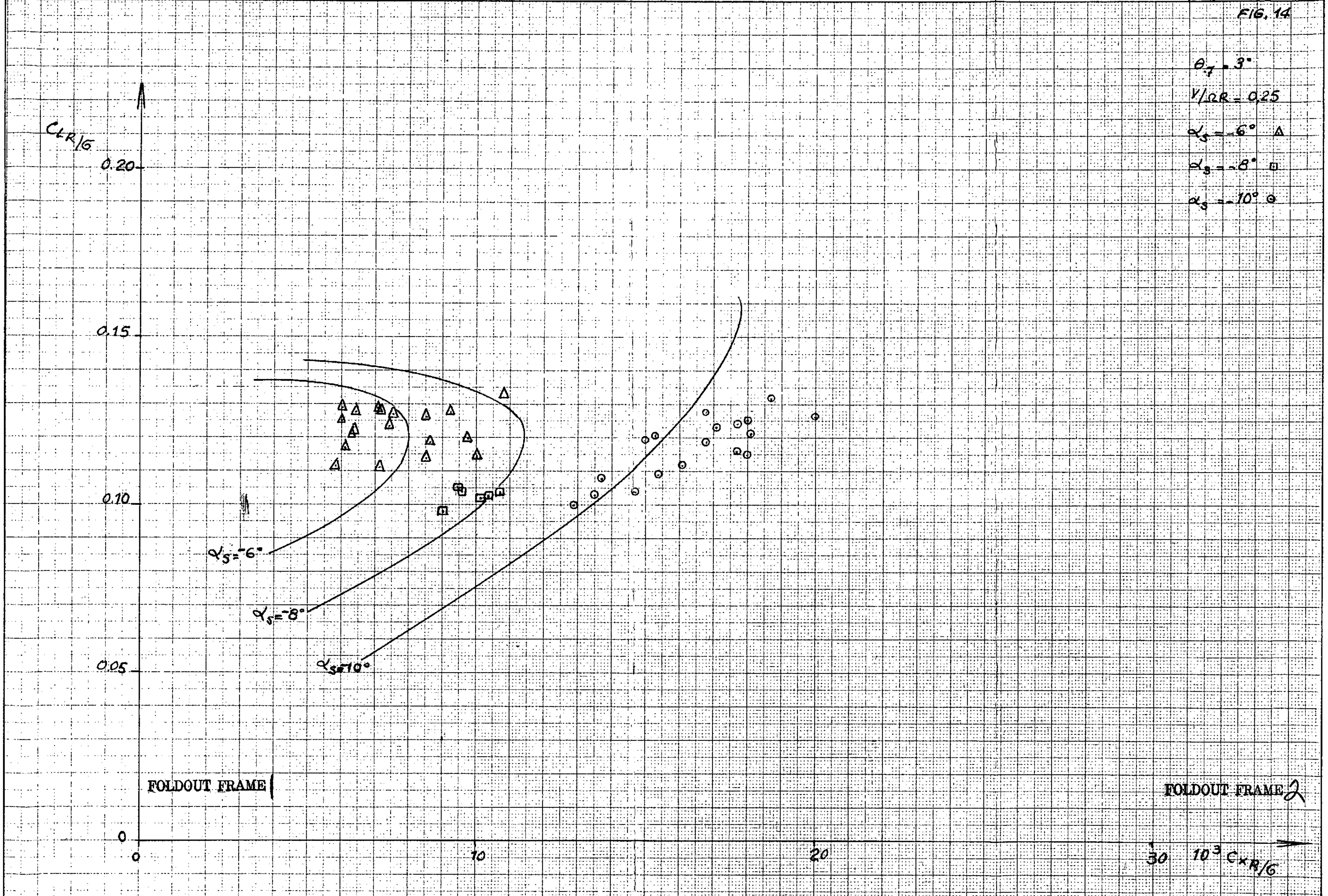


FOLDOUT FRAME 1

FOLDOUT FRAME 2

GIRAVIONS DORAND

FIG.14. VARIATION OF LIFT COEFFICIENT WITH PROPULSIVE FORCE COEFFICIENT.



FOLDOUT FRAME 1 FOLDOUT FRAME 2

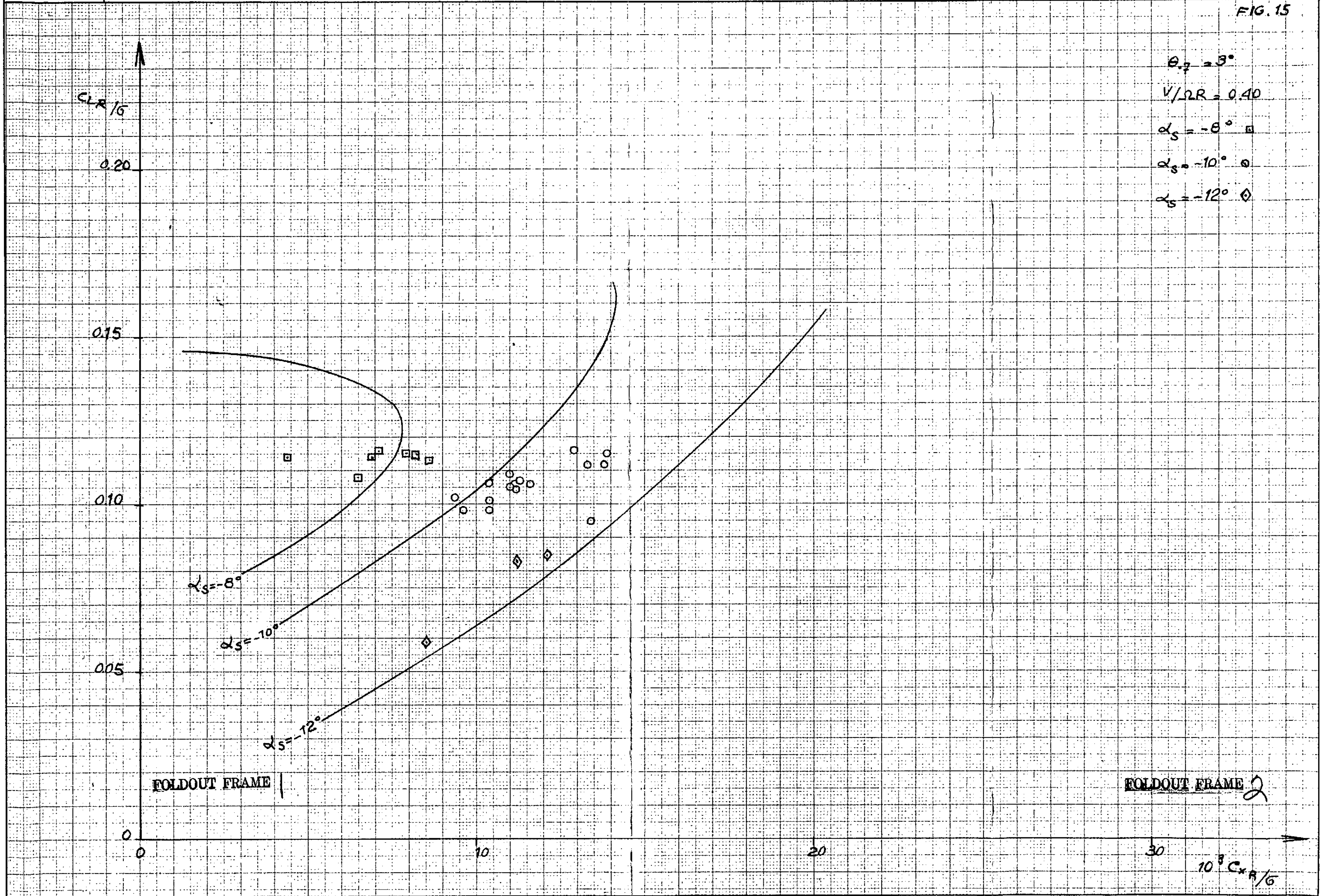
GIRAVIONS DORAND

FIG.15 - VARIATION OF LIFT COEFFICIENT WITH PROPULSIVE FORCE COEFFICIENT

Doct DH2011D.E5

Page: 100

FIG. 15



FOLDOUT FRAME 1

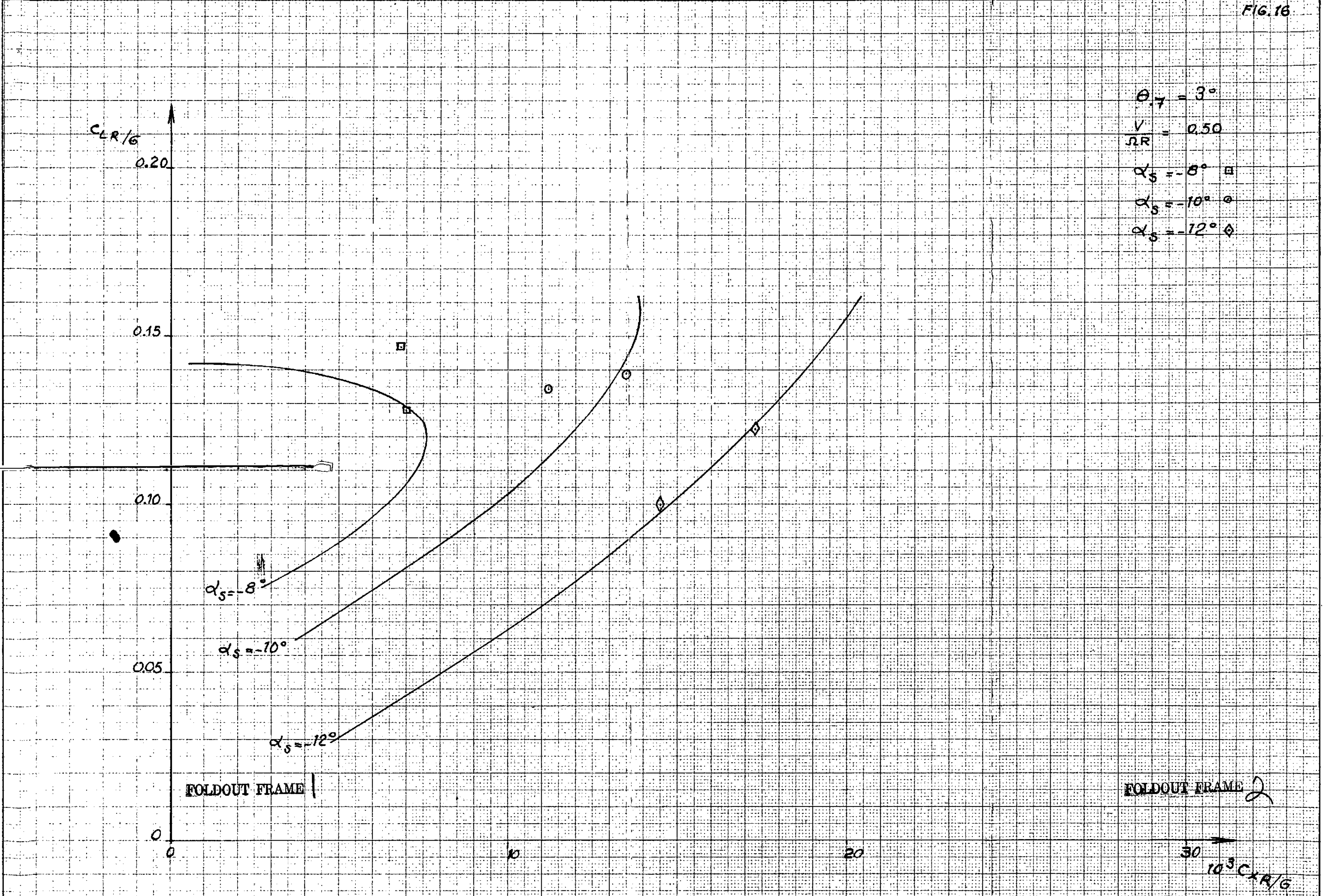
FOLDOUT FRAME 2

GIRAVIONS DORAND

FIG.16 - VARIATION OF LIFT COEFFICIENT WITH PROPULSIVE FORCE COEFFICIENT -

Doc^t DH 2011 D.E5

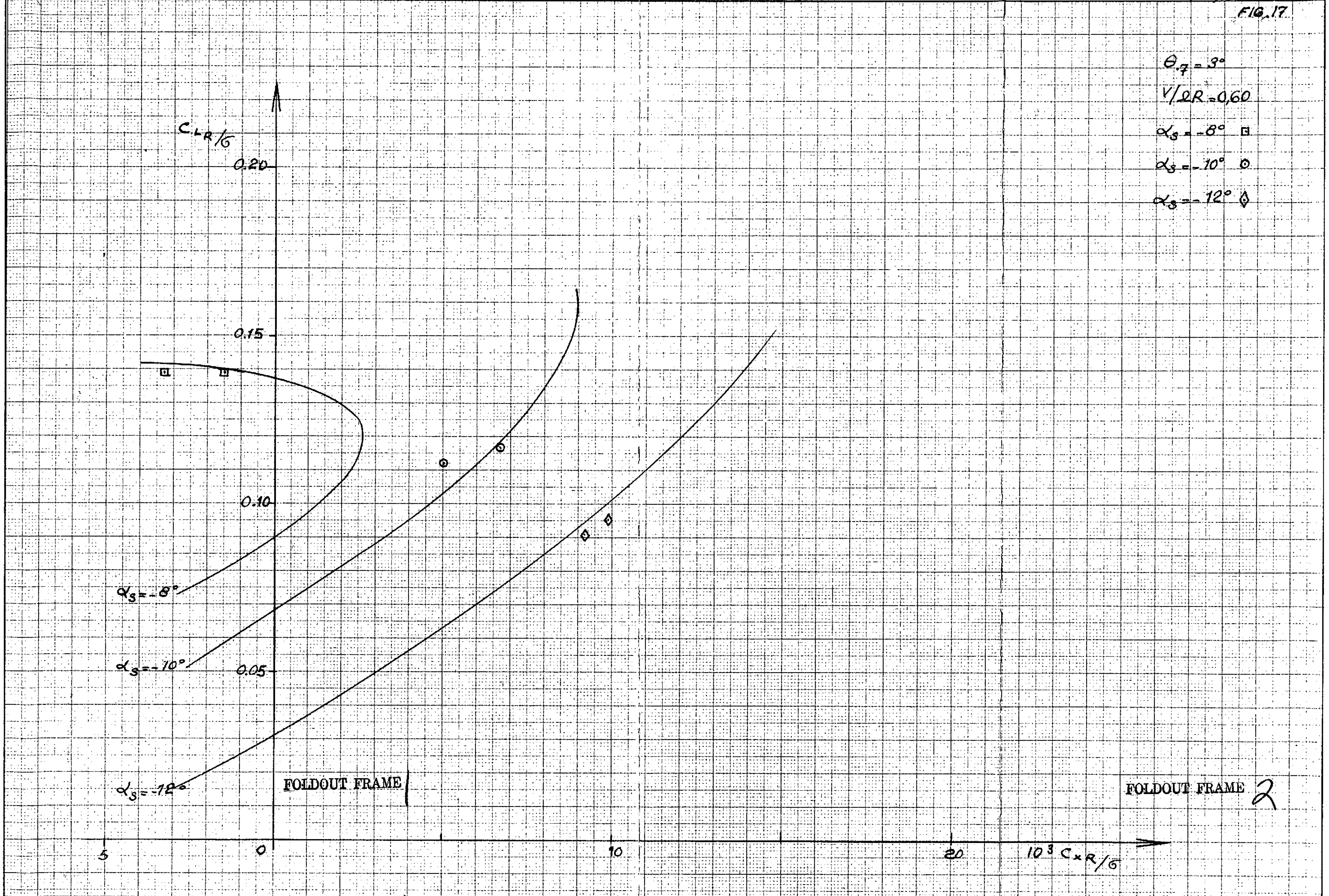
Page: 101



GIRAVIONS DORAND

FIG.17- VARIATION OF LIFT COEFFICIENT WITH PROPULSIVE FORCE COEFFICIENT -

FIG.17

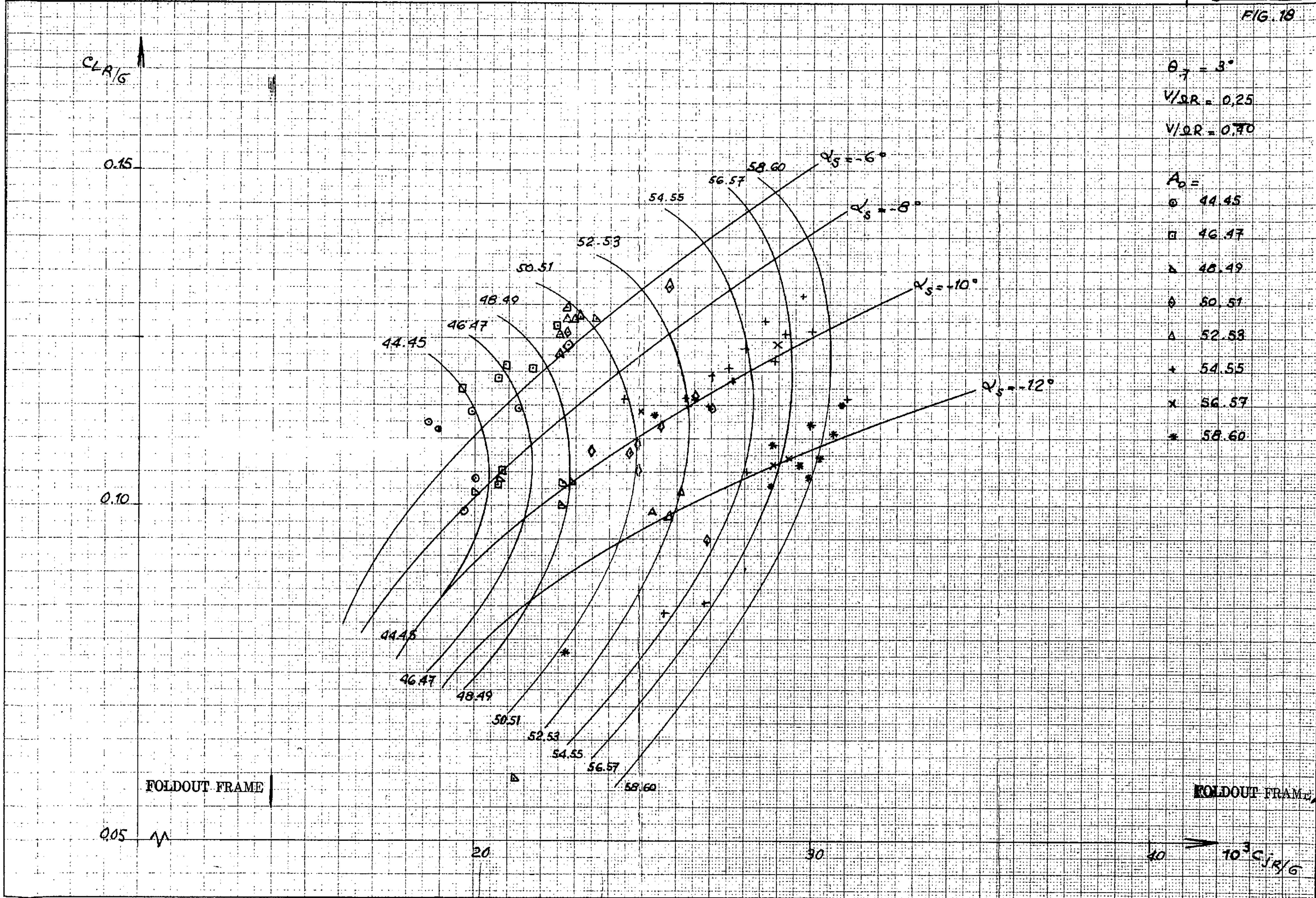


FOLDOUT FRAME 1

FOLDOUT FRAME 2

GIRAVIONS DORAND

FIG. 18 - VARIATION OF LIFT COEFFICIENT WITH JET MOMENTUM COEFFICIENT

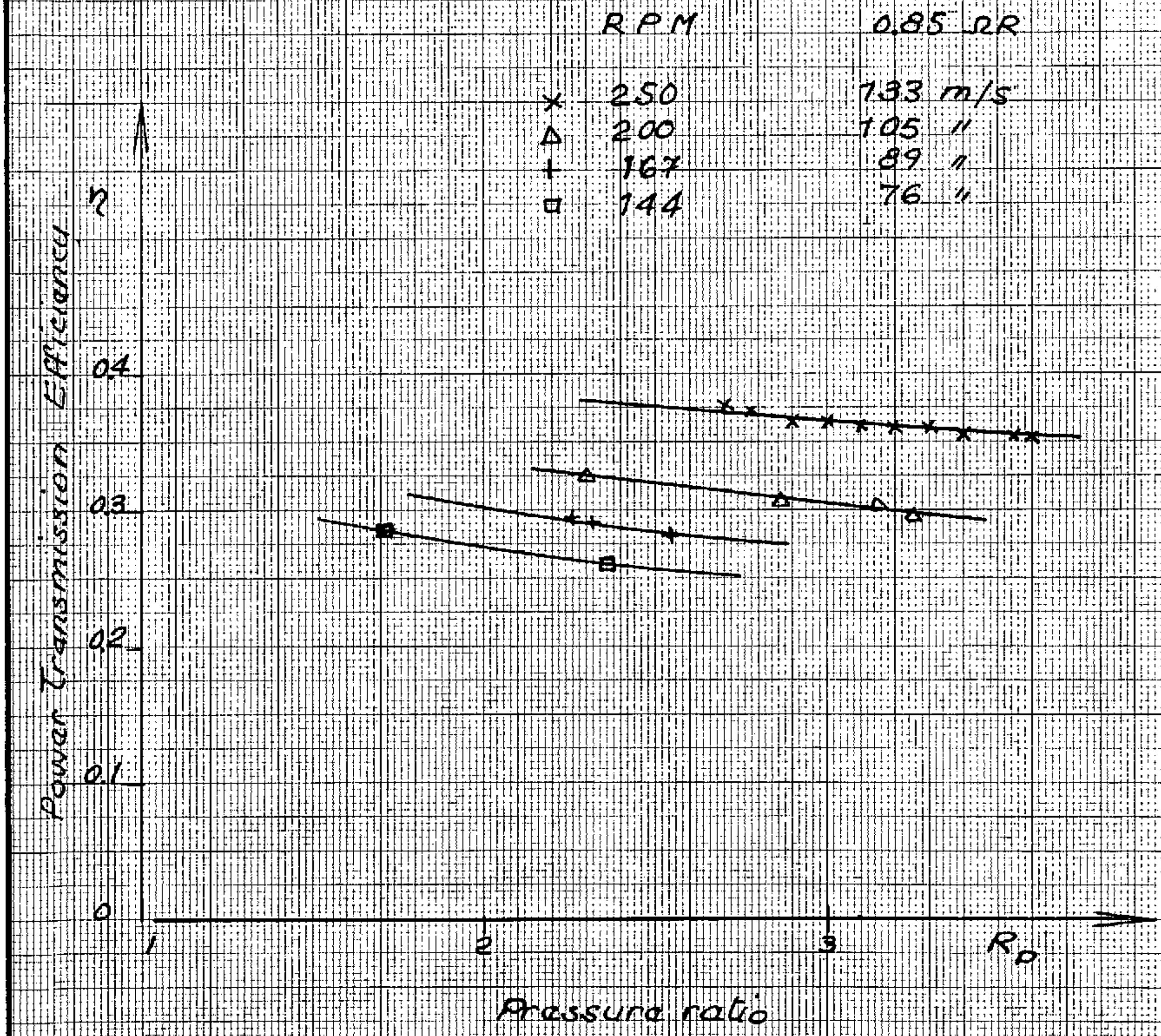


FOLDOUT FRAME 2

FIG.19

JET ROTOR POWER TRANSMISSION EFFICIENCY AS A FUNCTION OF THE PRESSURE RATIO FOR DIFFERENT VALUES OF THE ADVANCE RATIO.

$\eta = ESHP / GHP$



Remark _ Results obtained at high μ values

FIG. 20

FIG. 20 PROPULSION EFFICIENCY RATIO AS A FUNCTION OF ROTOR TILT ANGLE AND ADVANCE RATIO.

$$\eta_p = CPP / CPE$$

$$\alpha' \sim \frac{180}{\pi} X/L$$

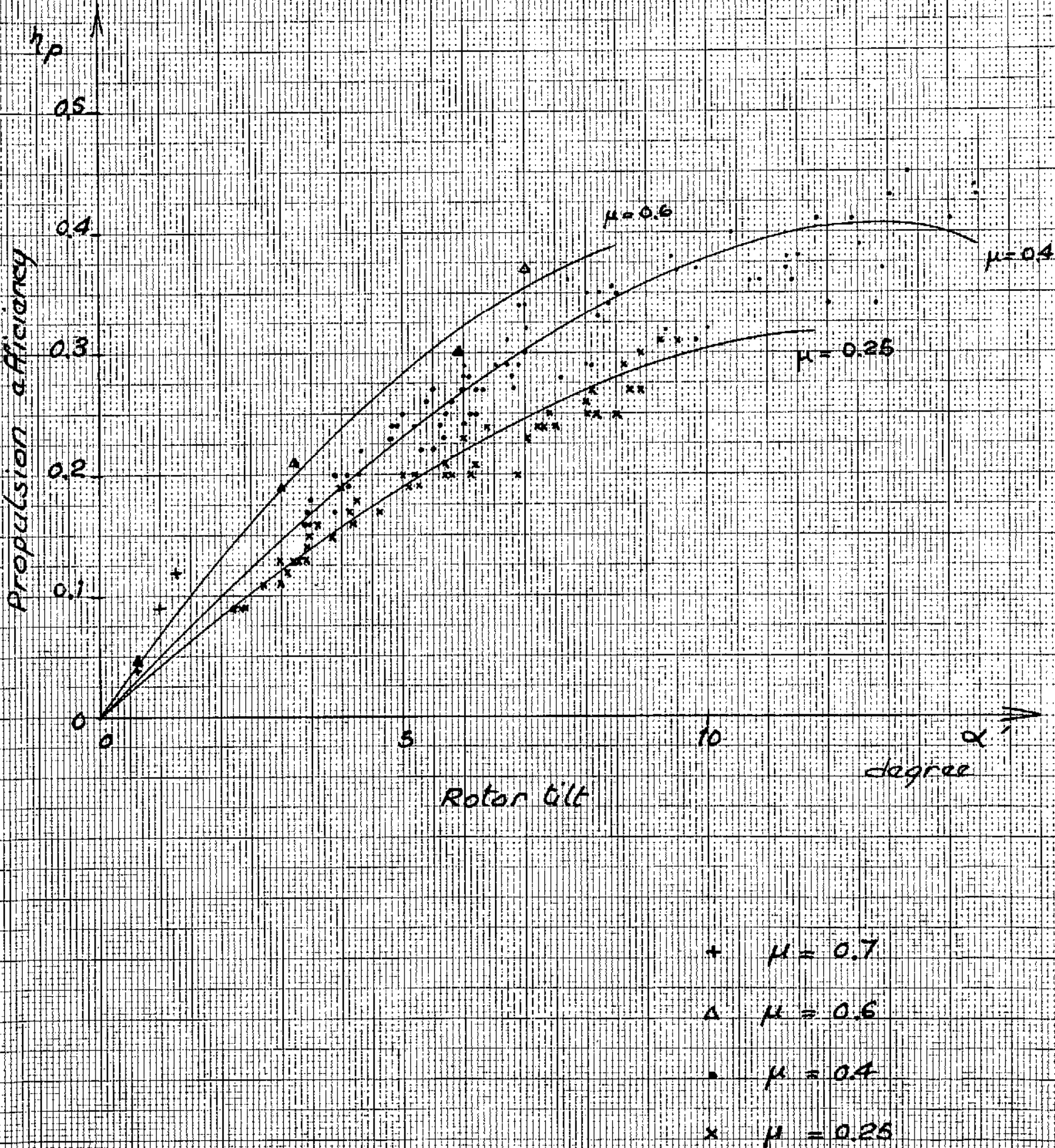


FIG. 21

FIG. 21 _ REPRESENTATION OF CAM I (BICYCLIC)

$\delta = + 11 \cos 2 (\Psi + \varphi)$; δ in degrees

$\varphi = 90°$

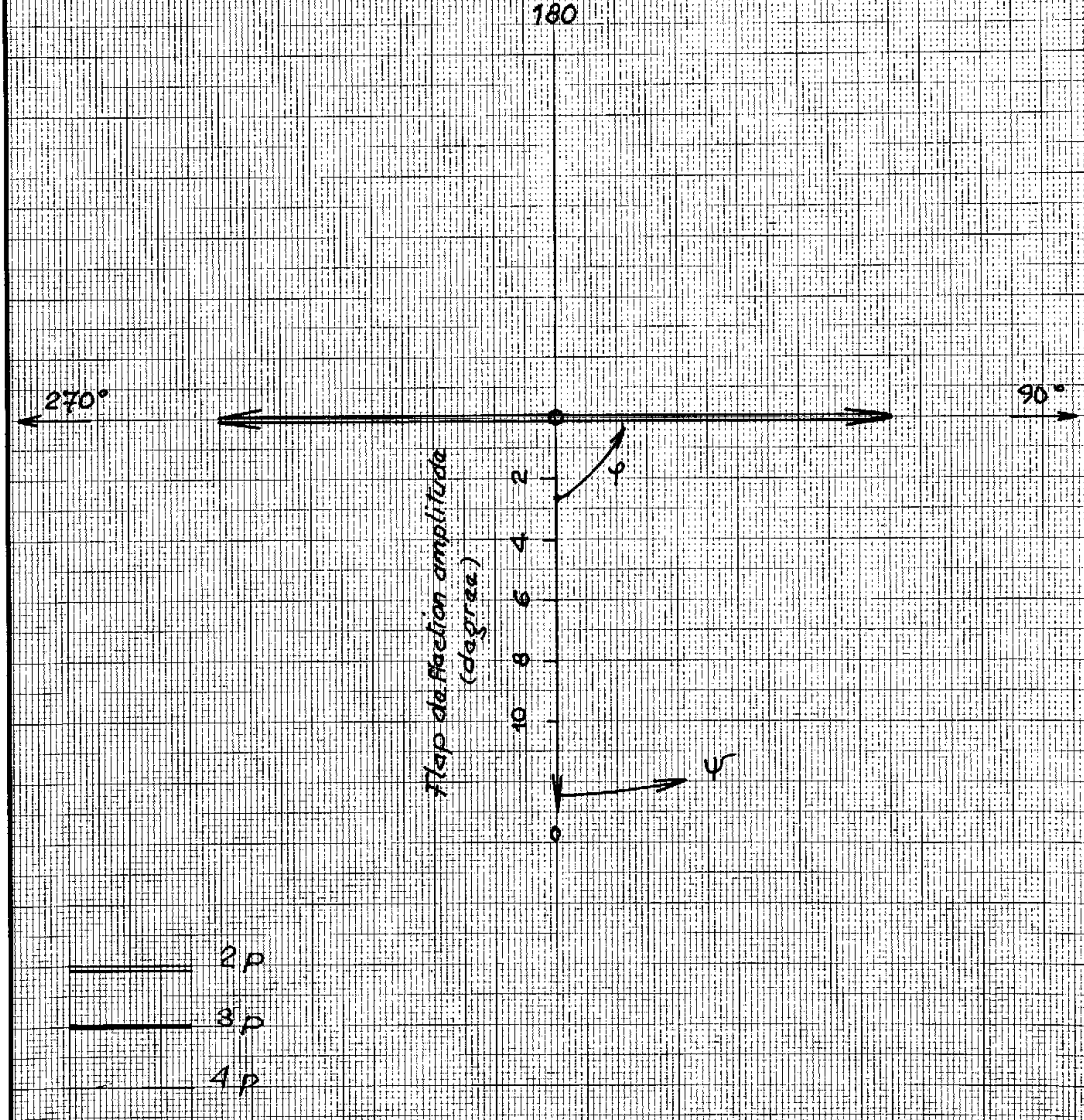
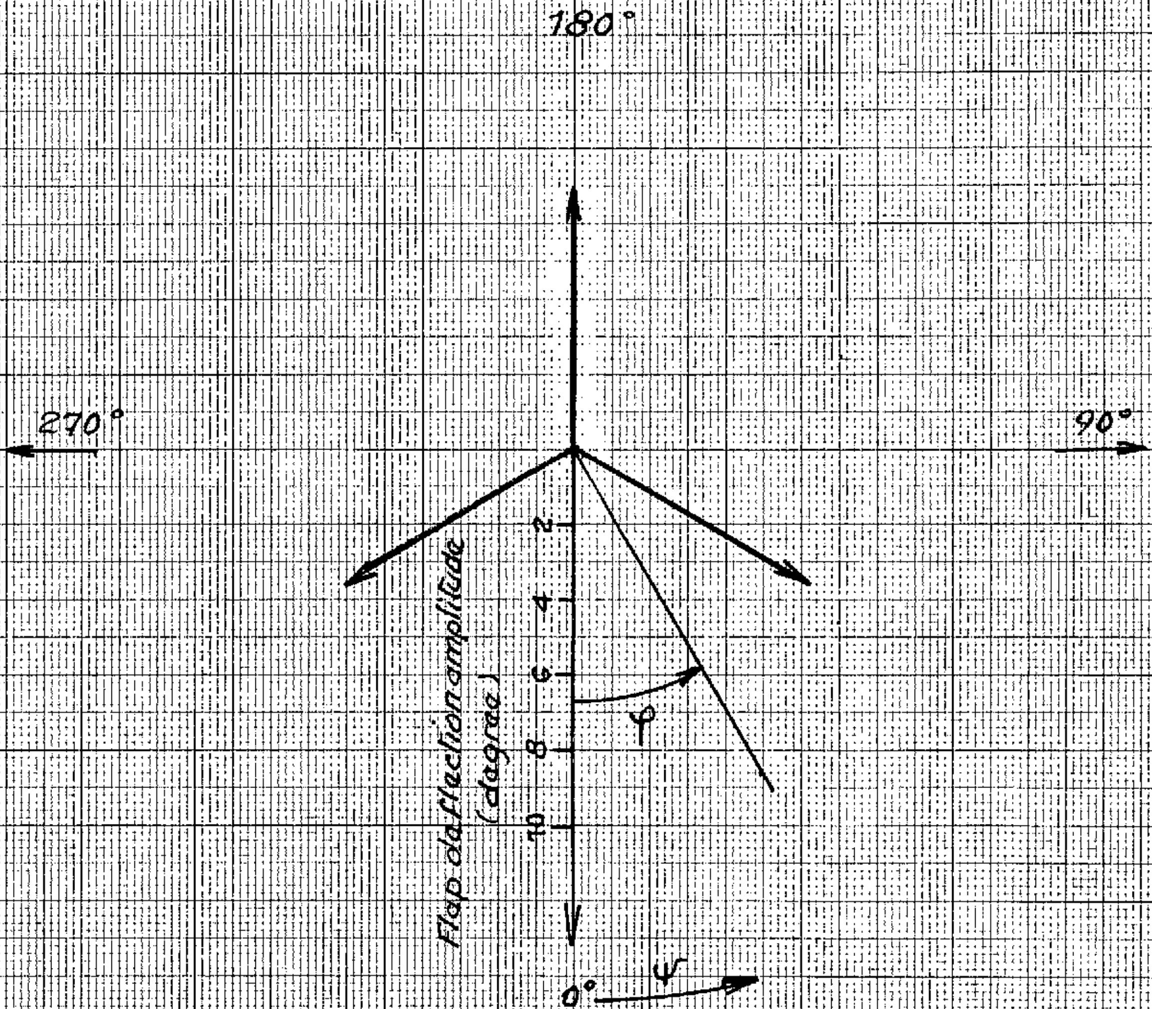


FIG. 22 - REPRESENTATION OF CAM V (TRICYCLIC)

$\delta = 7.0 \sin 3(\Psi + \varphi)$ δ in degrees

$\varphi = 30°$



2 p

3 p

4 p

FIG. 23. REPRESENTATION OF CAM III

$\delta = 2.5 \cos 2\Psi - 3.5 \cos 3\Psi + 2.5 \cos 4\Psi$ δ in degrees

$+ 2.3 \sin 2\Psi - 3 \sin 3\Psi$.

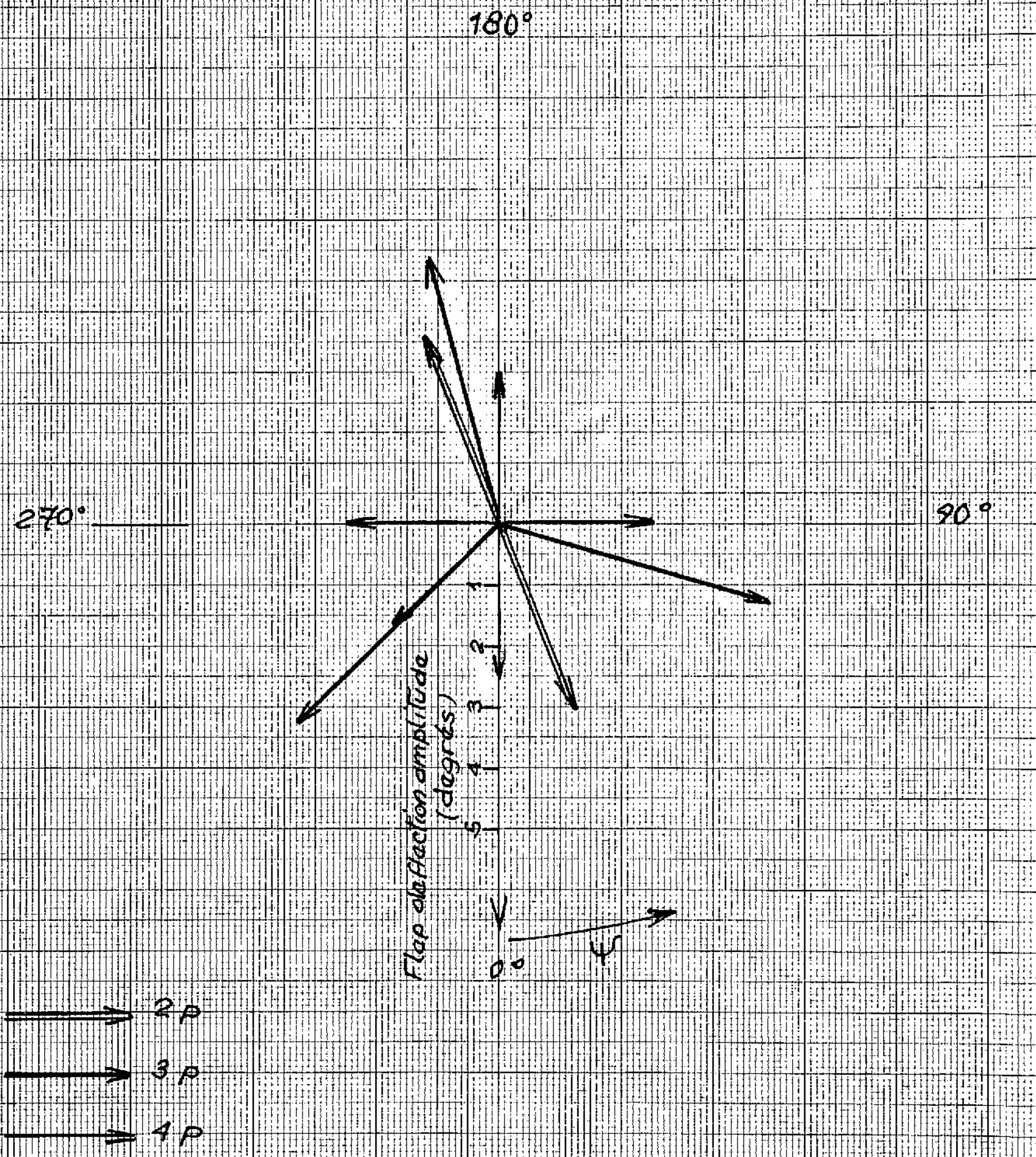
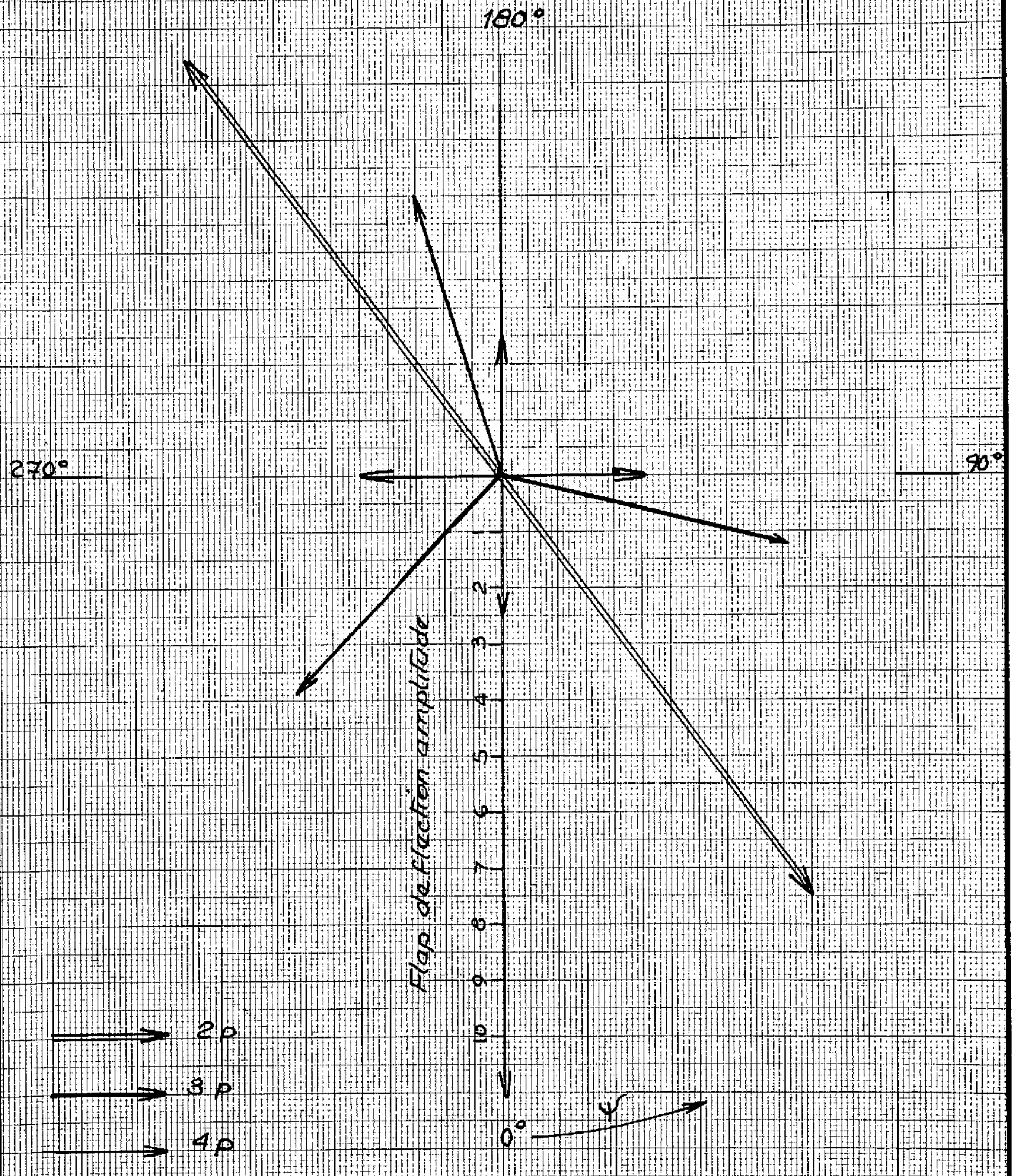


FIG.24

FIG.24 _ REPRESENTATION OF CAM IV

$\delta = 2.5 \cos 2\Psi - 3.5 \cos 3\Psi + 2.5 \cos 4\Psi$ δ in degrees

$+ 9 \sin 2\Psi - 4 \sin 3\Psi$



GIRAVIONS DORAND		Doc' DH.2011 D. E 5
		Page 110

FIG. 25

FIG. 25 _ DISTRIBUTION OF THE 2p HARMONIC COMPONENT OF THE MULTICYCLIC CAMS USED IN THE TESTS.

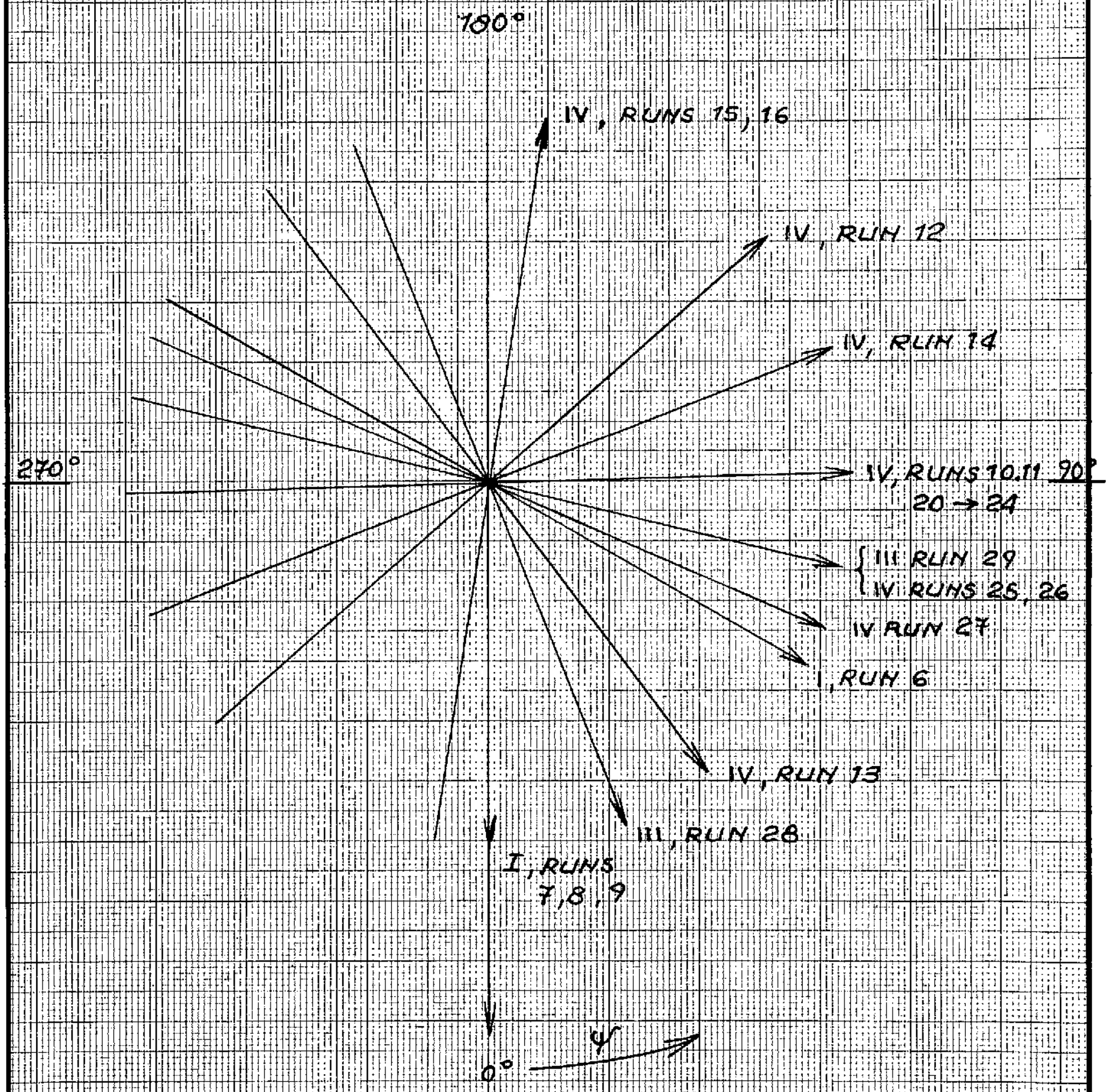


FIG. 26

FIG. 26 _ DISTRIBUTION OF THE 3p HARMONIC COMPONENT OF THE MULTICYCLIC CAMS USED IN THE TESTS.

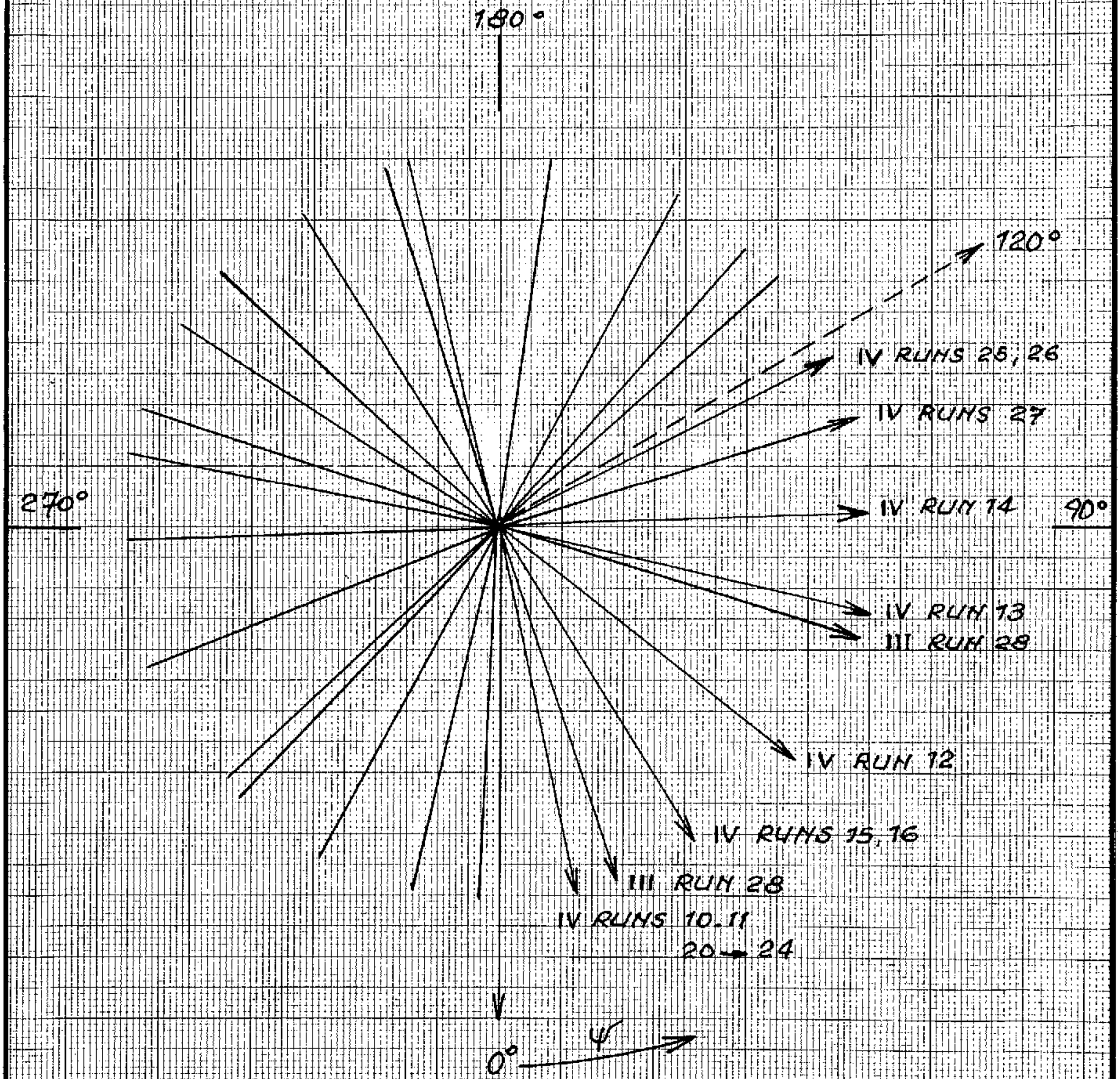


FIG. 27

FIG 27. DISTRIBUTION OF THE 4p HARMONIC COMPONENT OF THE MULTICYCLIC CAMS USED IN THE TESTS.

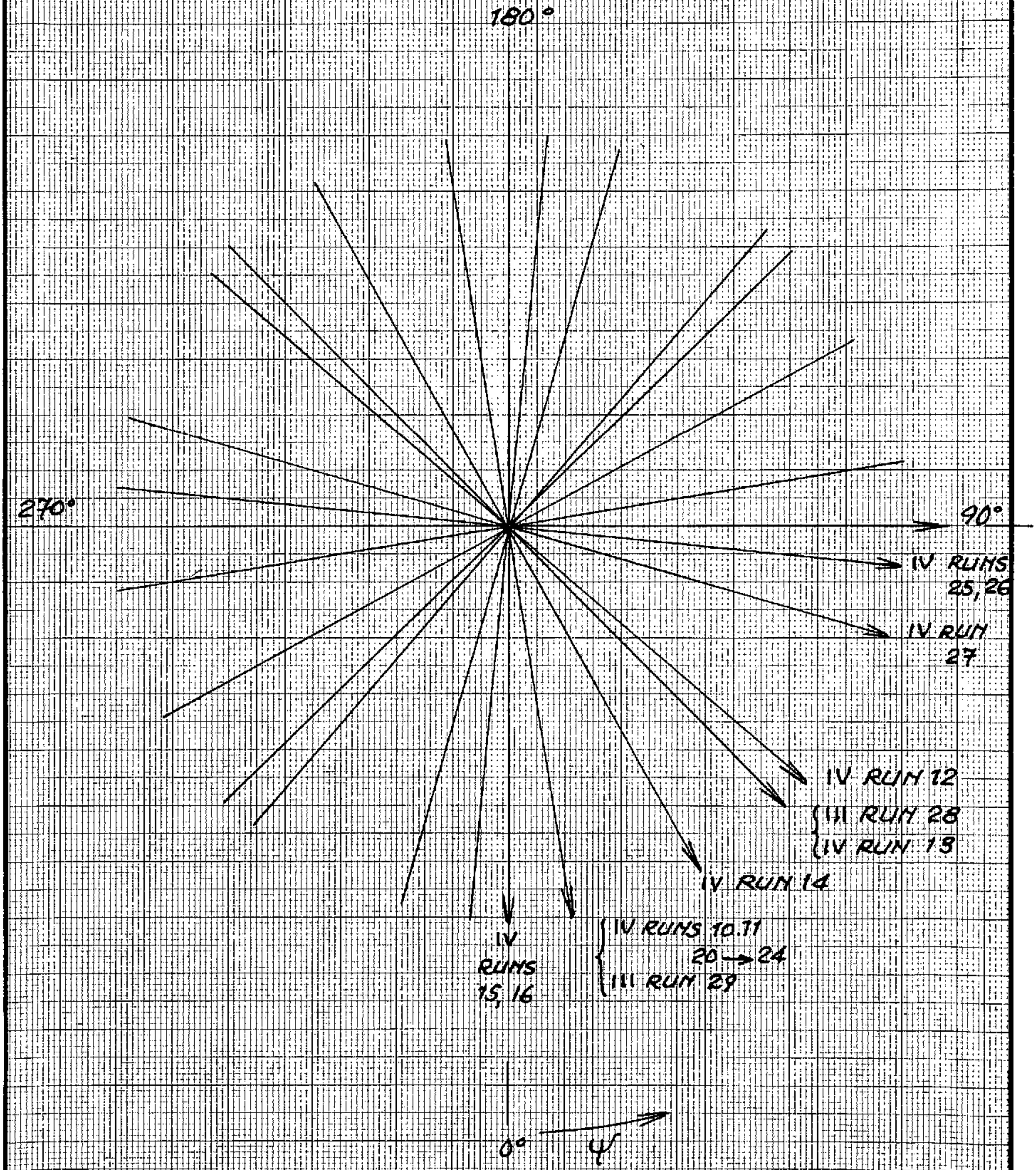
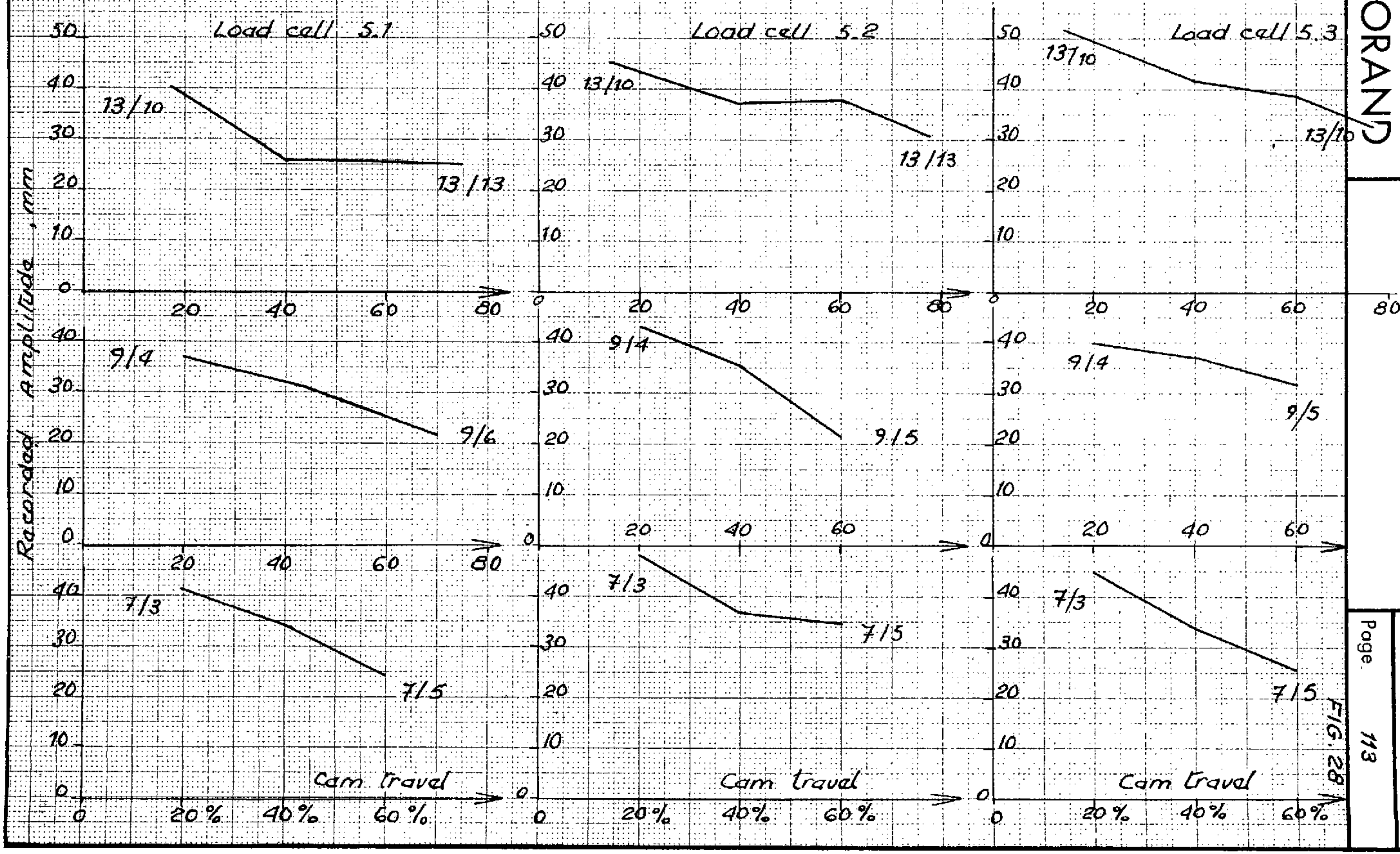


FIG. 28 REDUCTION OF VIBRATORY FORCES

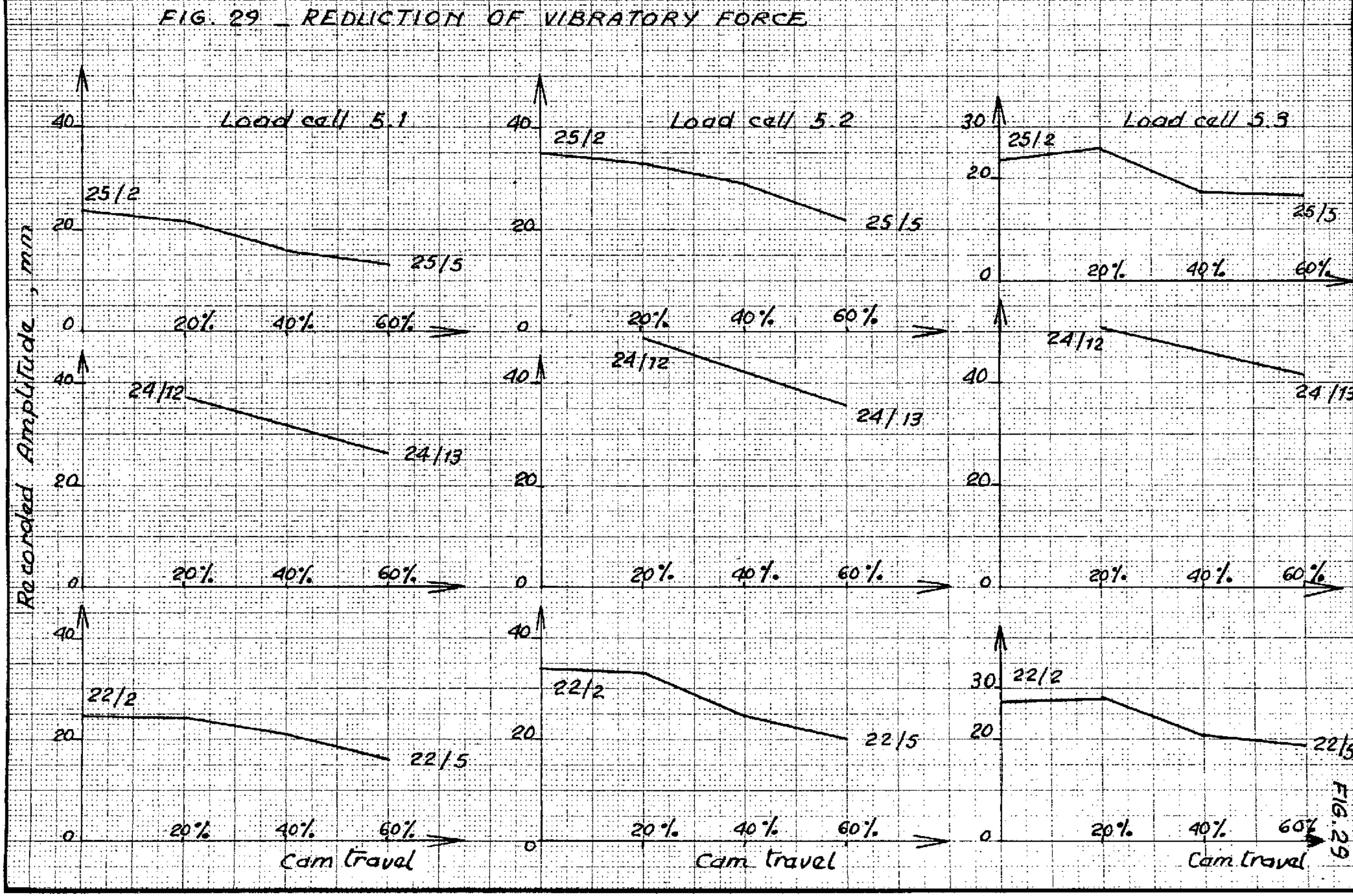


GIRAVIONS DORAND

Page 113

Doc' DH.2011D.E5

47 200



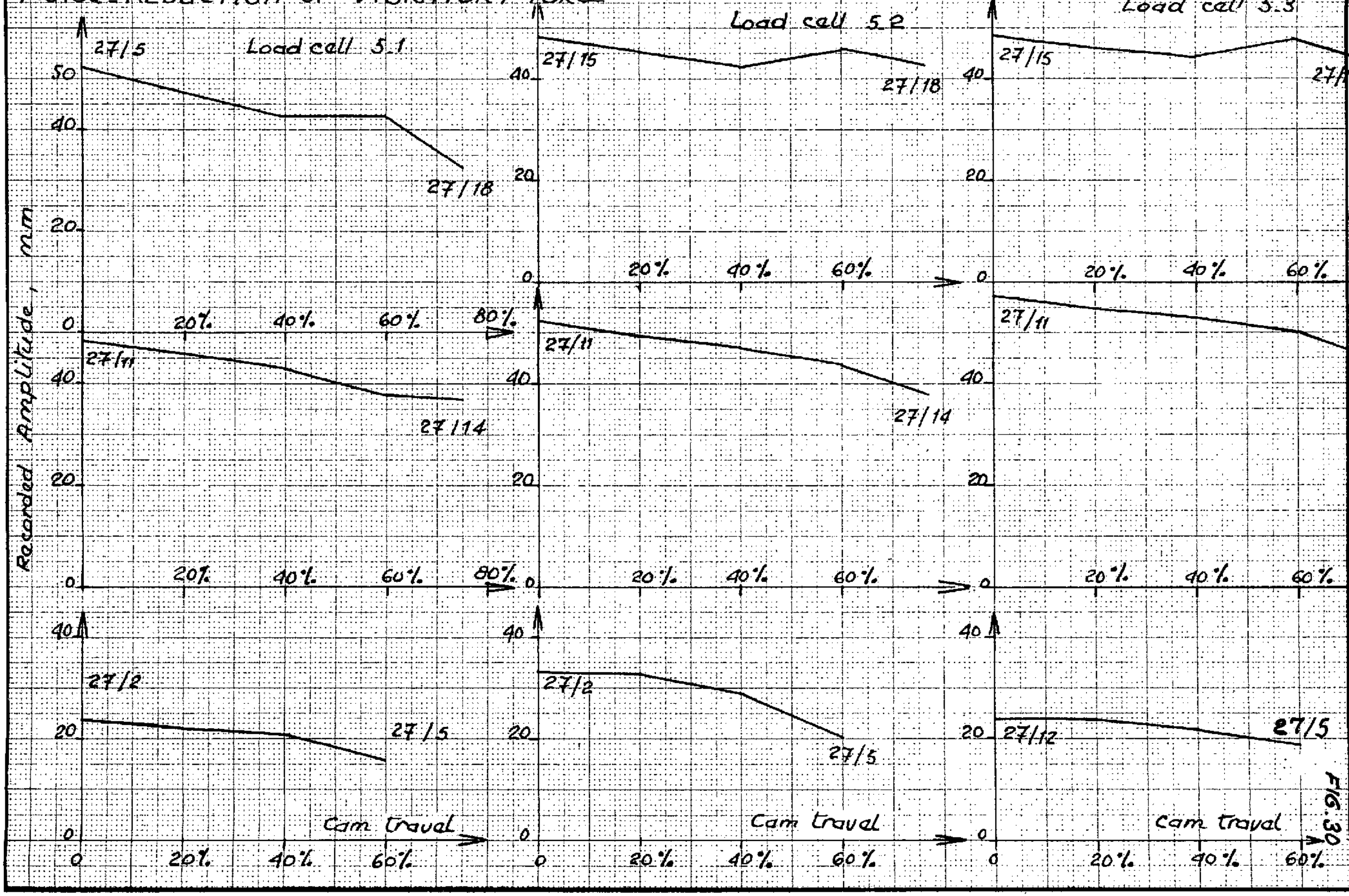
GIRAVIONS DORAND

Page 114

Doc' DH.2011 D.E5

FIG. 29

FIG. 30 - REDUCTION OF VIBRATORY FORCE



GIRAVIONS DORAND

Page 115

Doc' DH. 2011 D. E5

47 200

FIG.31

FIG.31 – REDUCTION OF VIBRATORY FORCES

Load cell S.1

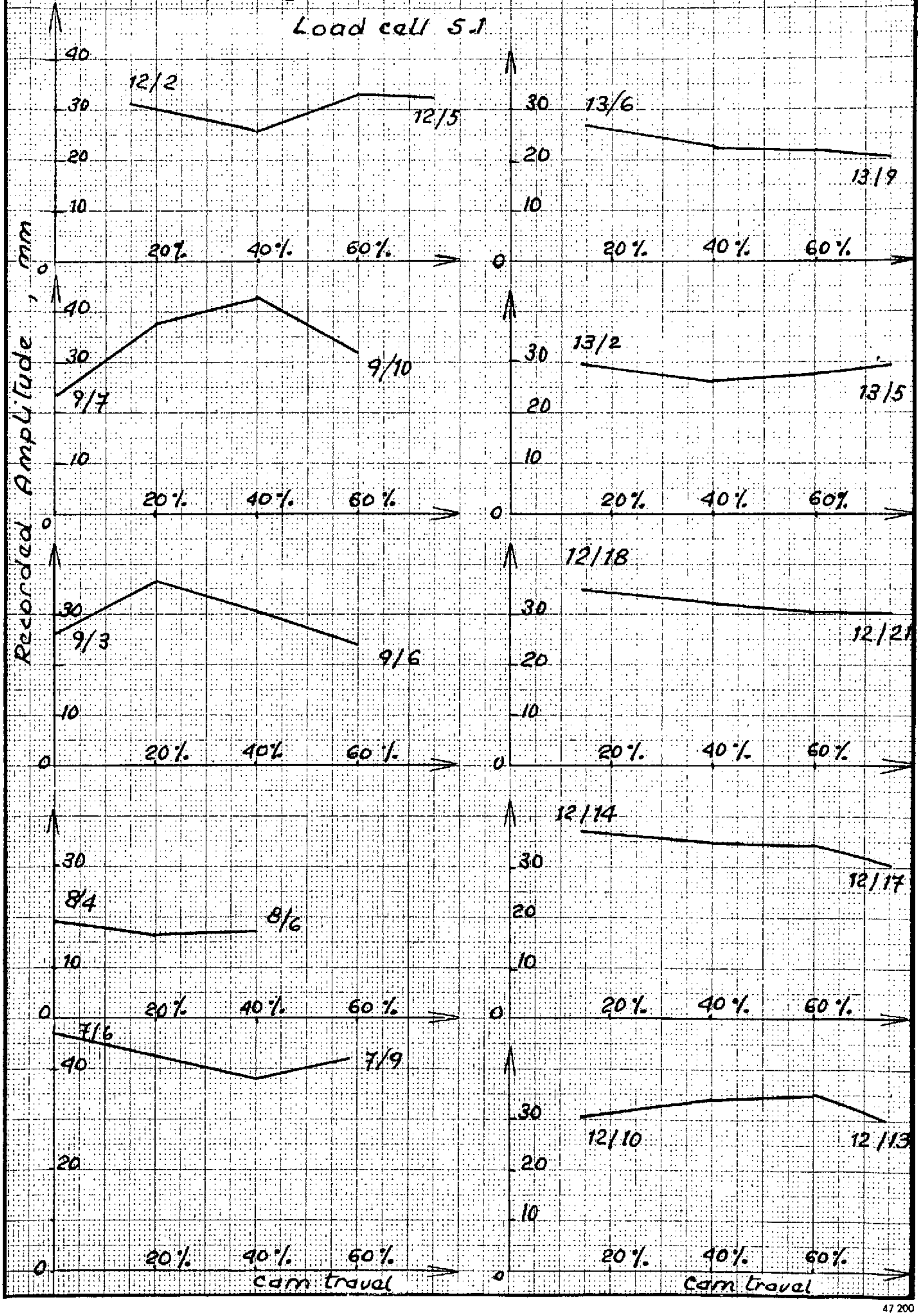
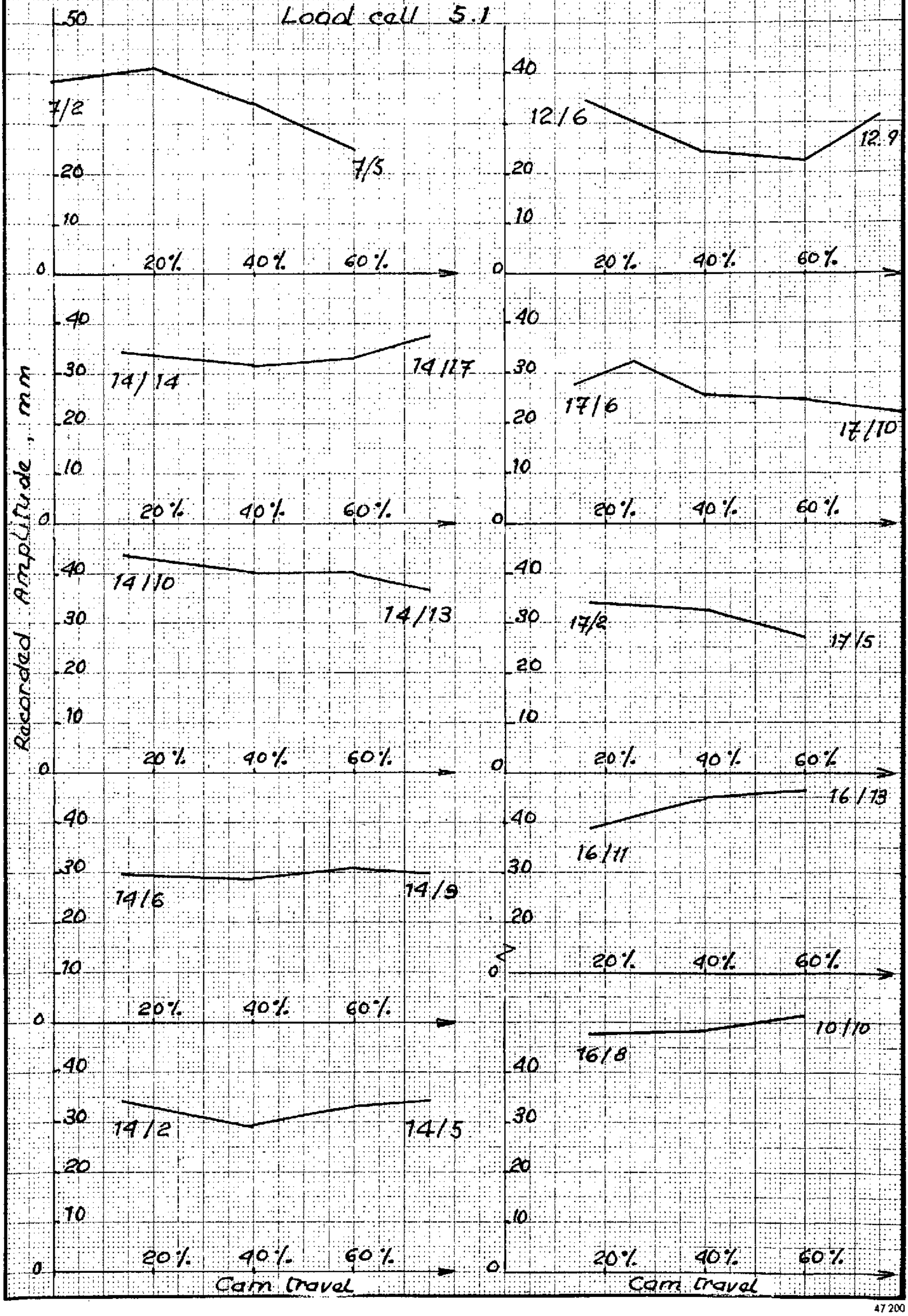
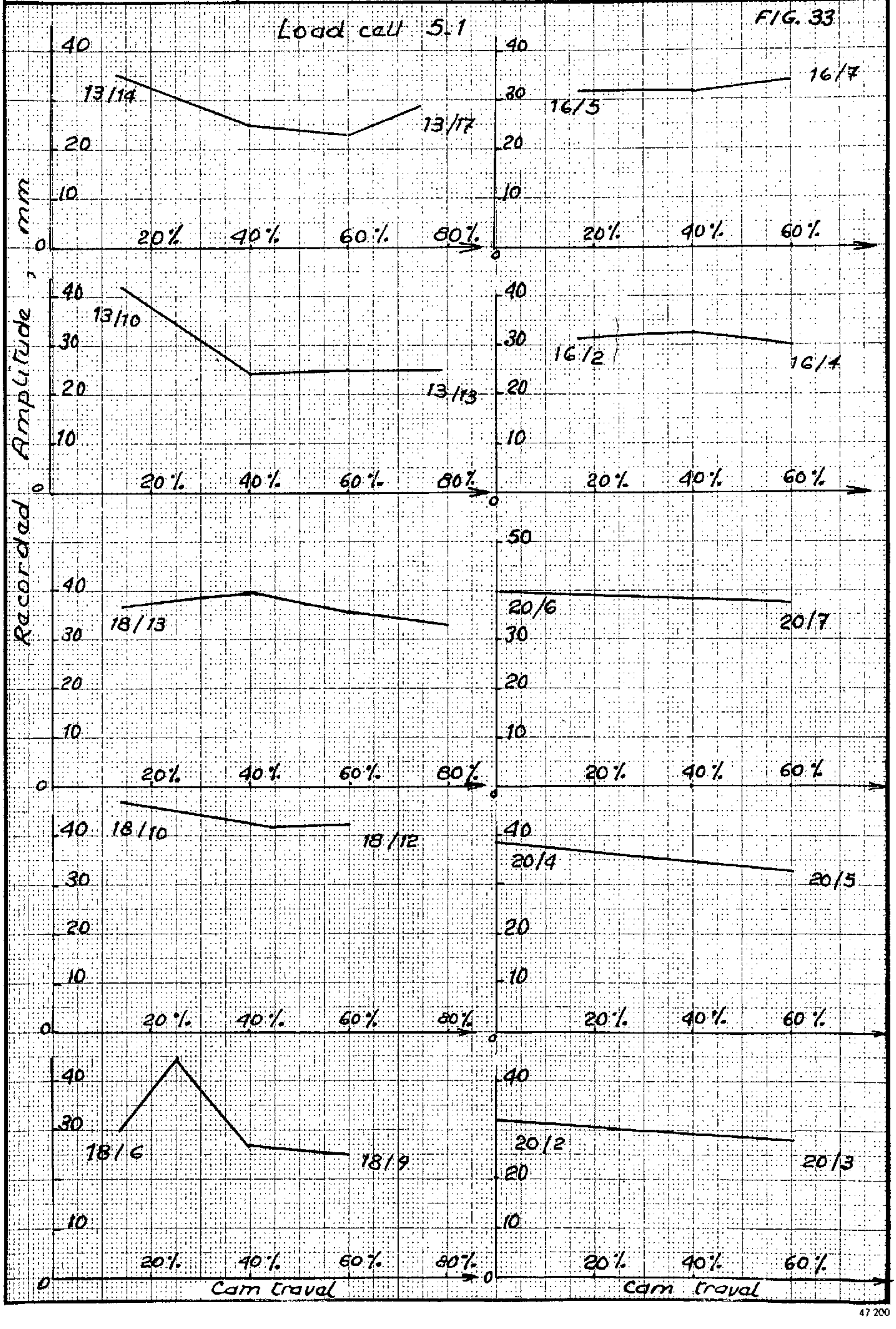


FIG. 32

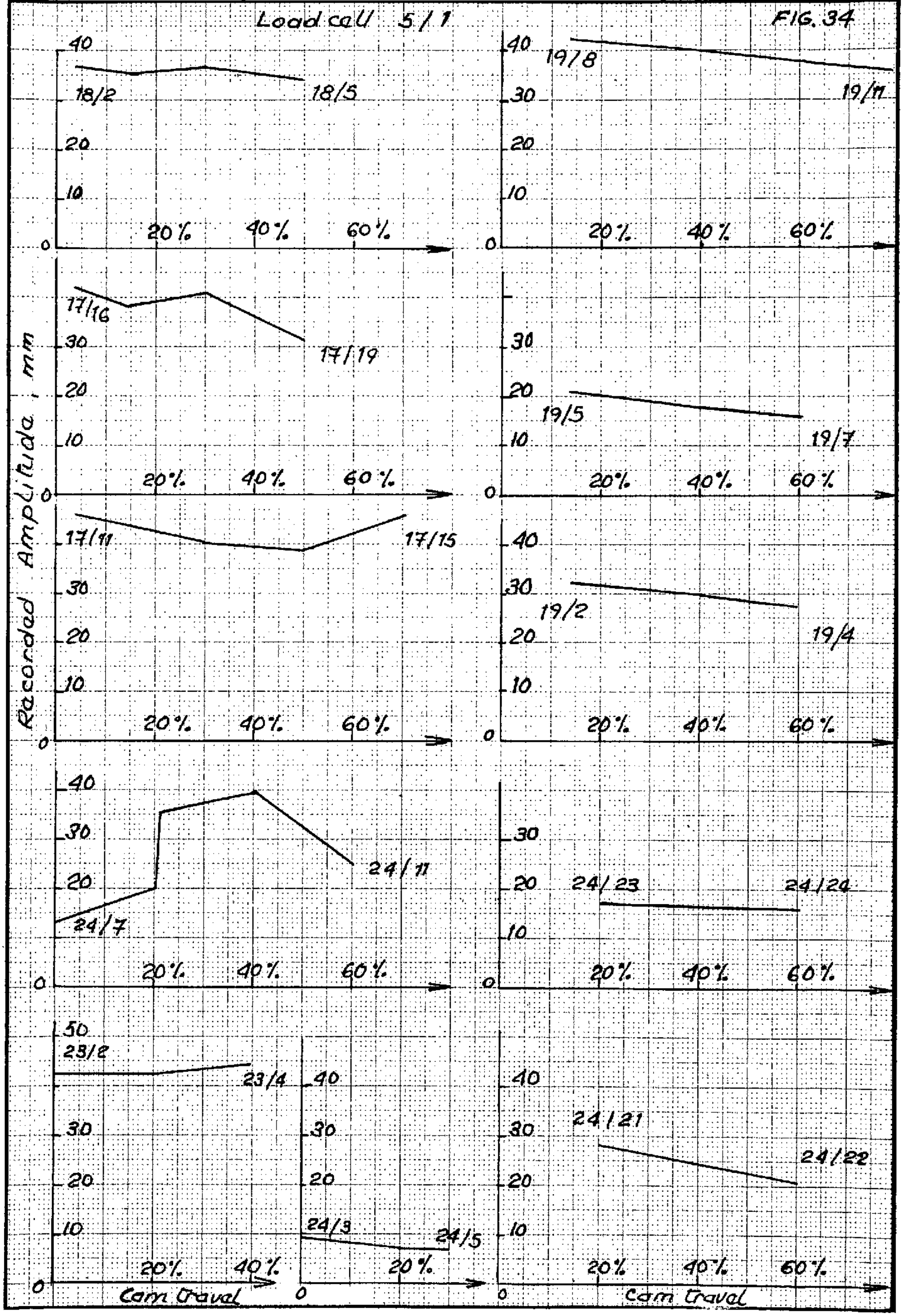


Load cell 5.1
Recorded Amplitude, mm
7/2
7/5
12/6
12.9
14/14
14/17
17/6
17/10
14/10
14/13
17/2
17/5
14/6
14/9
16/11
16/13
14/2
14/5
16/8
10/10
20%
40%
60%
Cam travel

GIRAVIONS DORAND	FIG. 33 _REDUCTION OF VIBRATORY FORCES	Doc DH 2011D.E5 Page 118



47 200


Load cell 5/1
FIG. 34
Recorded Amplitude, mm
18/2
18/5
19/8
19/11
17/16
17/19
19/5
19/7
17/11
17/15
19/2
19/4
24/7
24/11
24/23
24/24
23/2
23/4
24/3
24/5
24/21
24/22
20%
40%
60%
Cam travel

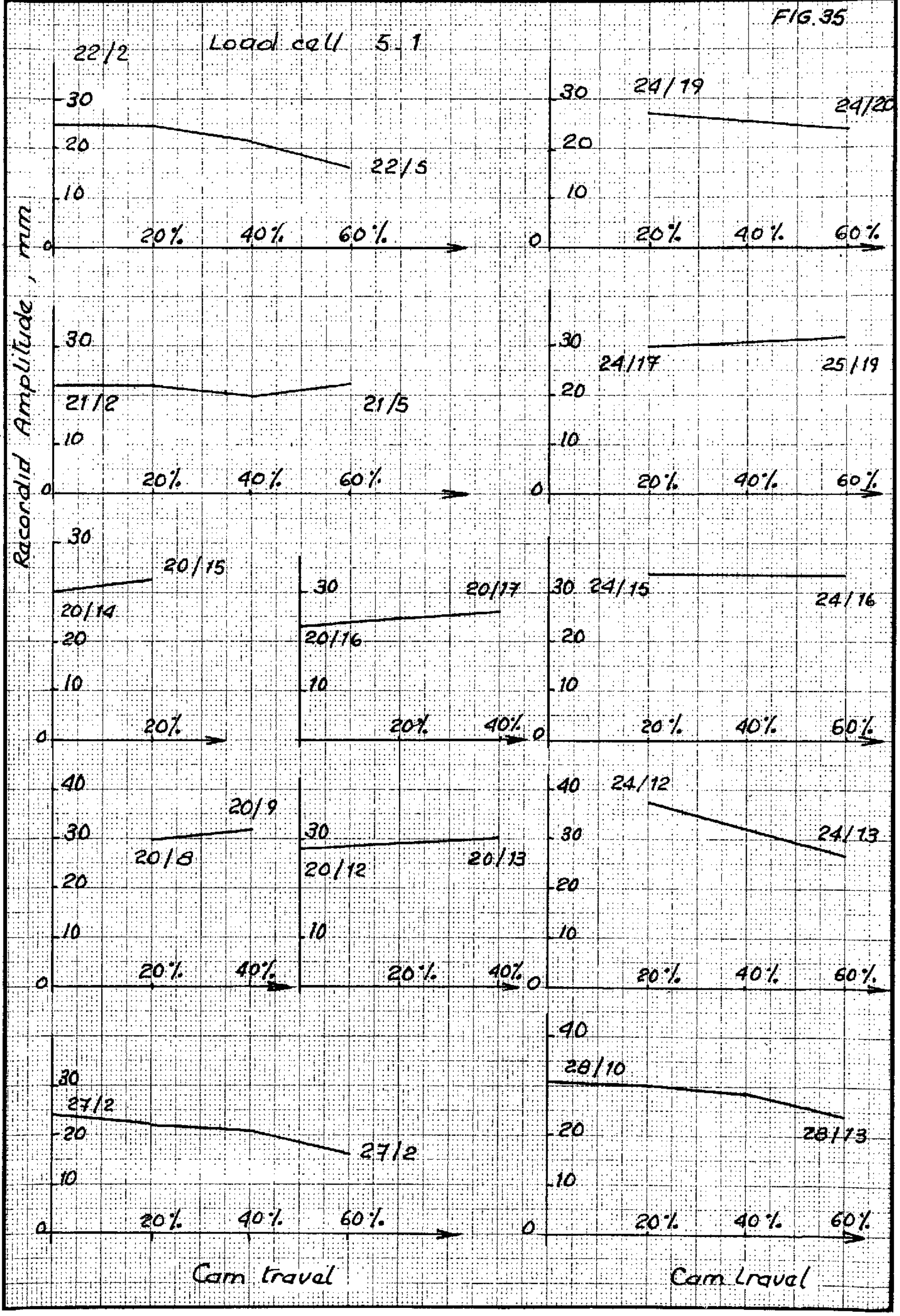


FIG. 35
Load cell 5.1
22/2
22/5
24/19
24/20
21/2
21/5
24/17
25/19
20/15
20/14
20/17
20/16
24/15
24/16
20/9
20/8
20/12
20/13
24/12
24/13
27/2
27/2
28/10
28/13
Recordid Amplitude, mm
0
10
20
30
40
20%
40%
60%
Cam travel
Cam travel

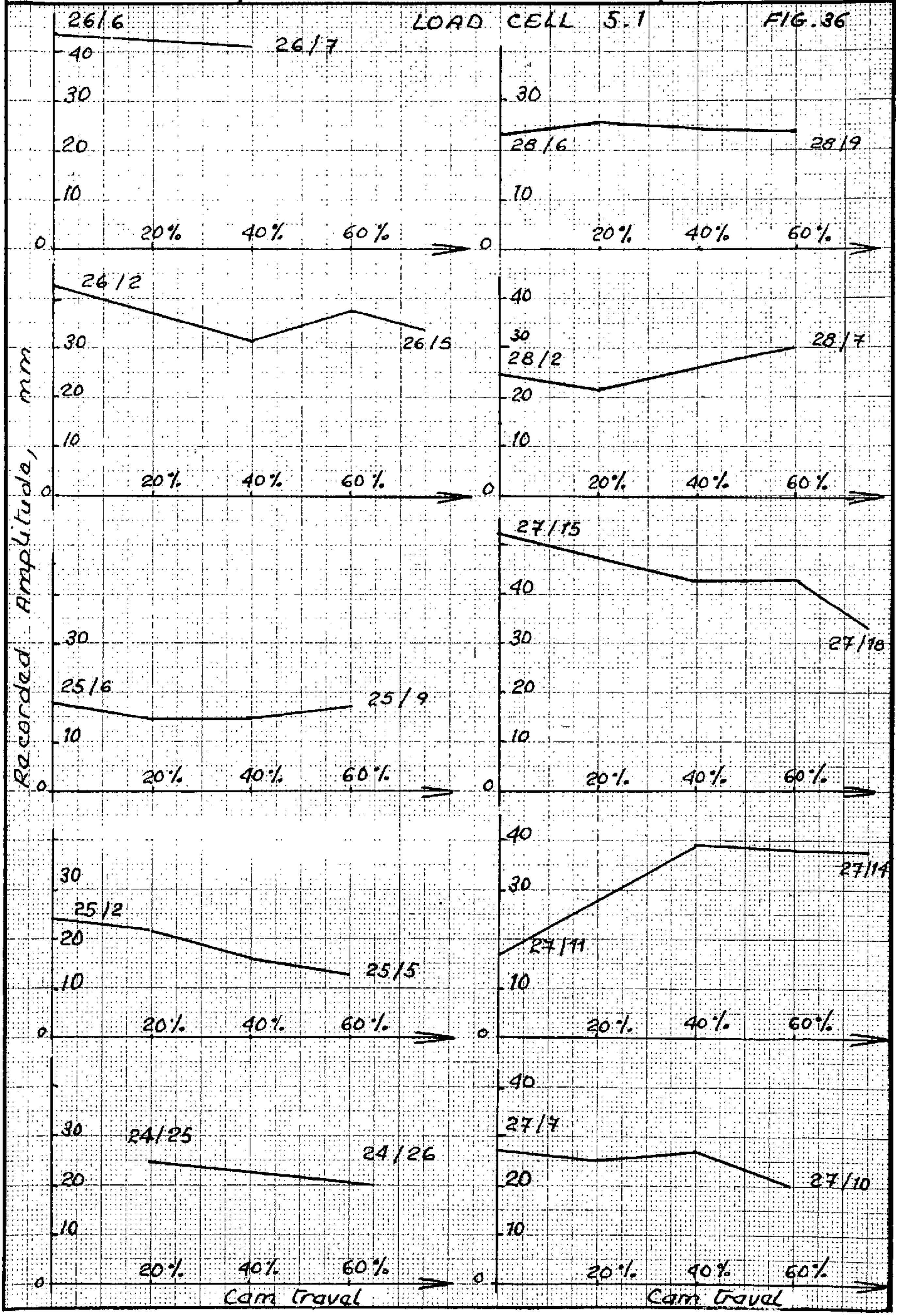

LOAD CELL 5.1
FIG. 36
Recorded Amplitude, mm
26/6
26/7
28/6
28/9
26/2
26/5
28/2
28/7
27/15
27/18
25/6
25/9
25/2
25/5
27/11
27/14
24/25
24/26
27/7
27/10
20%
40%
60%
Cam travel
Cam travel

FIG.37_ REDUCTION OF VIBRATORY FORCES

Load call 5-1

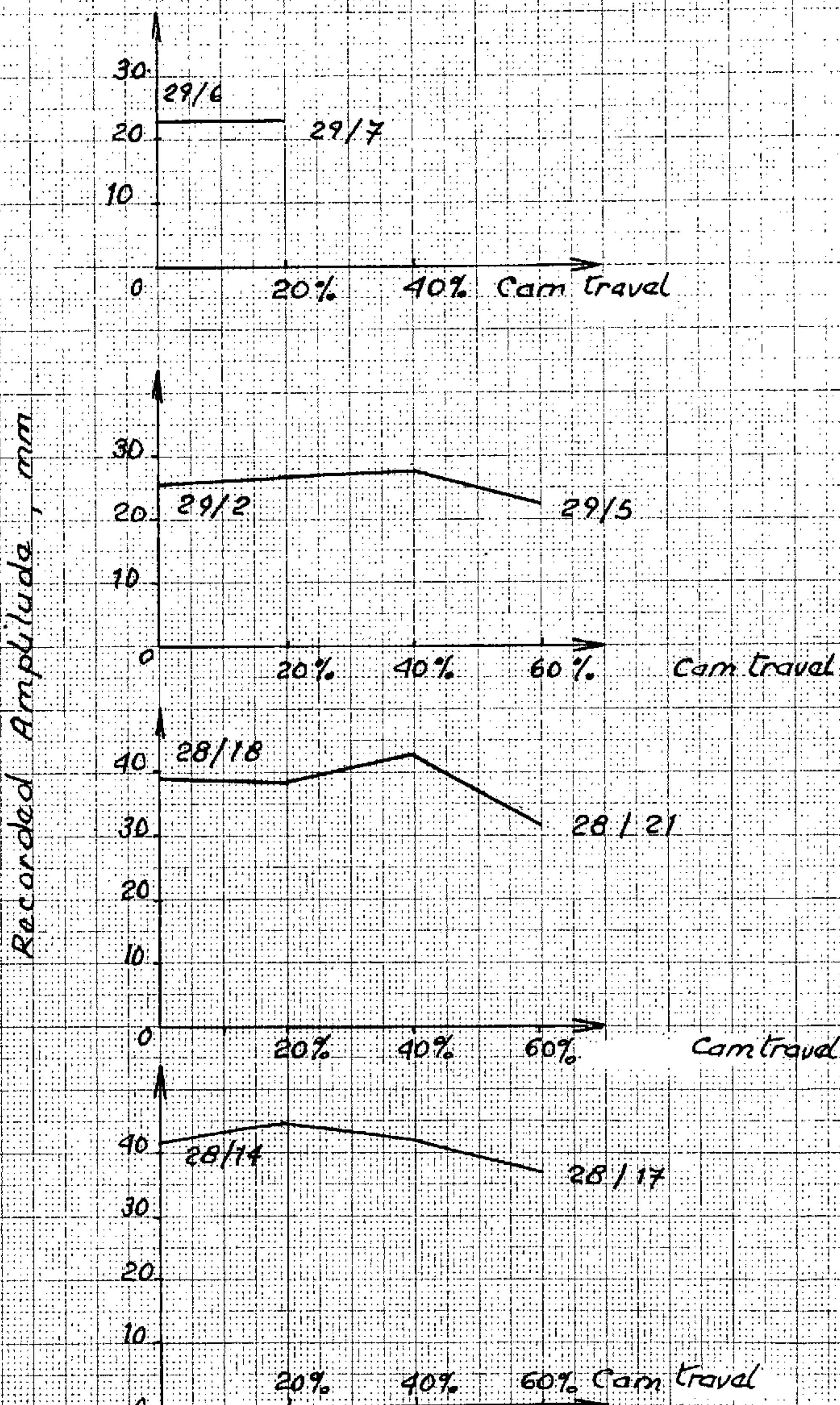


FIG.38_ PEAK - TO - PEAK STRESS REDUCTION

DUE TO THE MULTICYCLIC CAM.

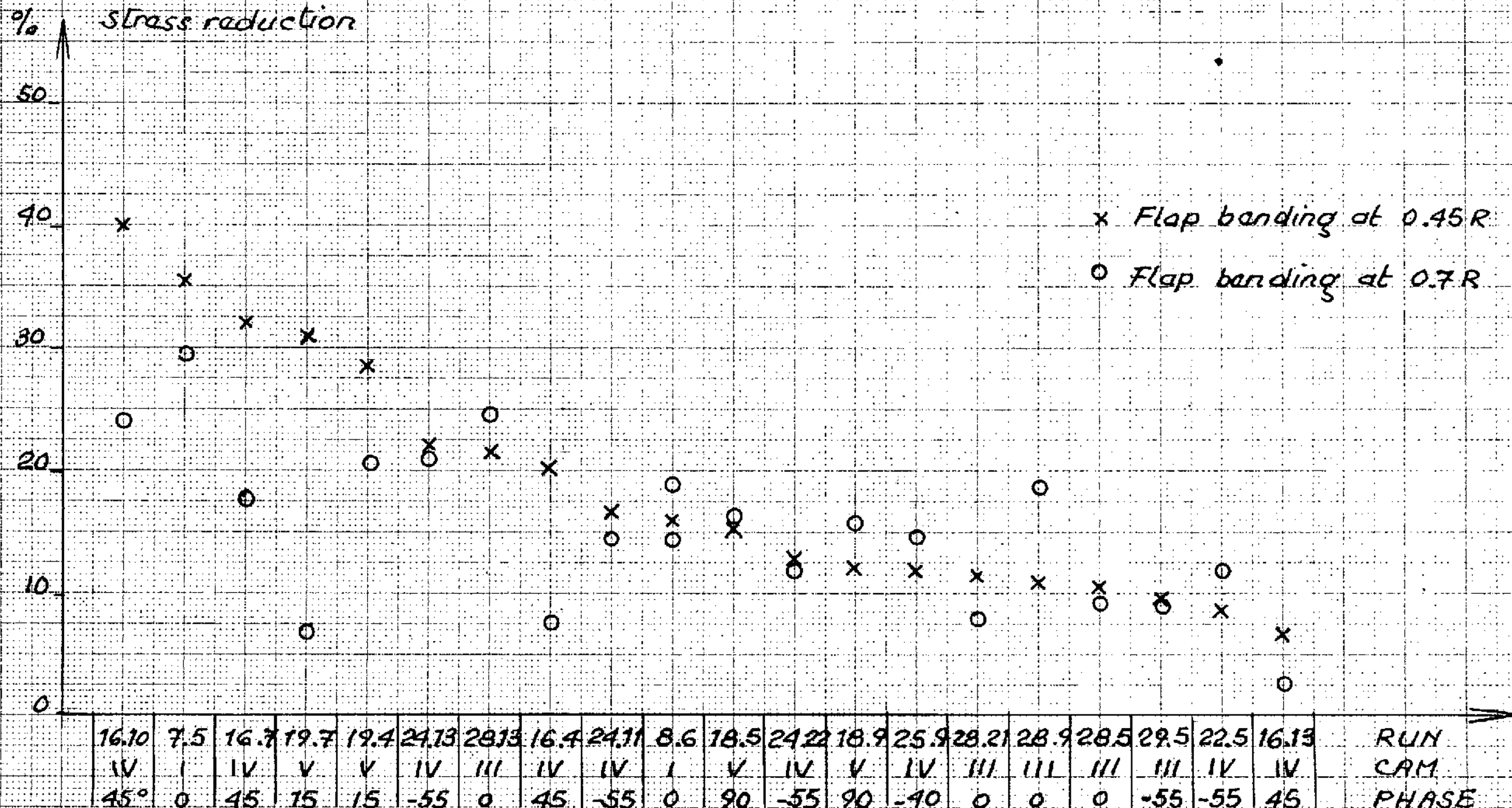


FIG 38

GIRAVIONS DORAND

Page 123

Doc' DH.2011C.E5

FIG.39 _ PEAK-TO-PEAK VIBRATORY FORCE REDUCTION

DUE TO THE MULTICYCLIC CAM.

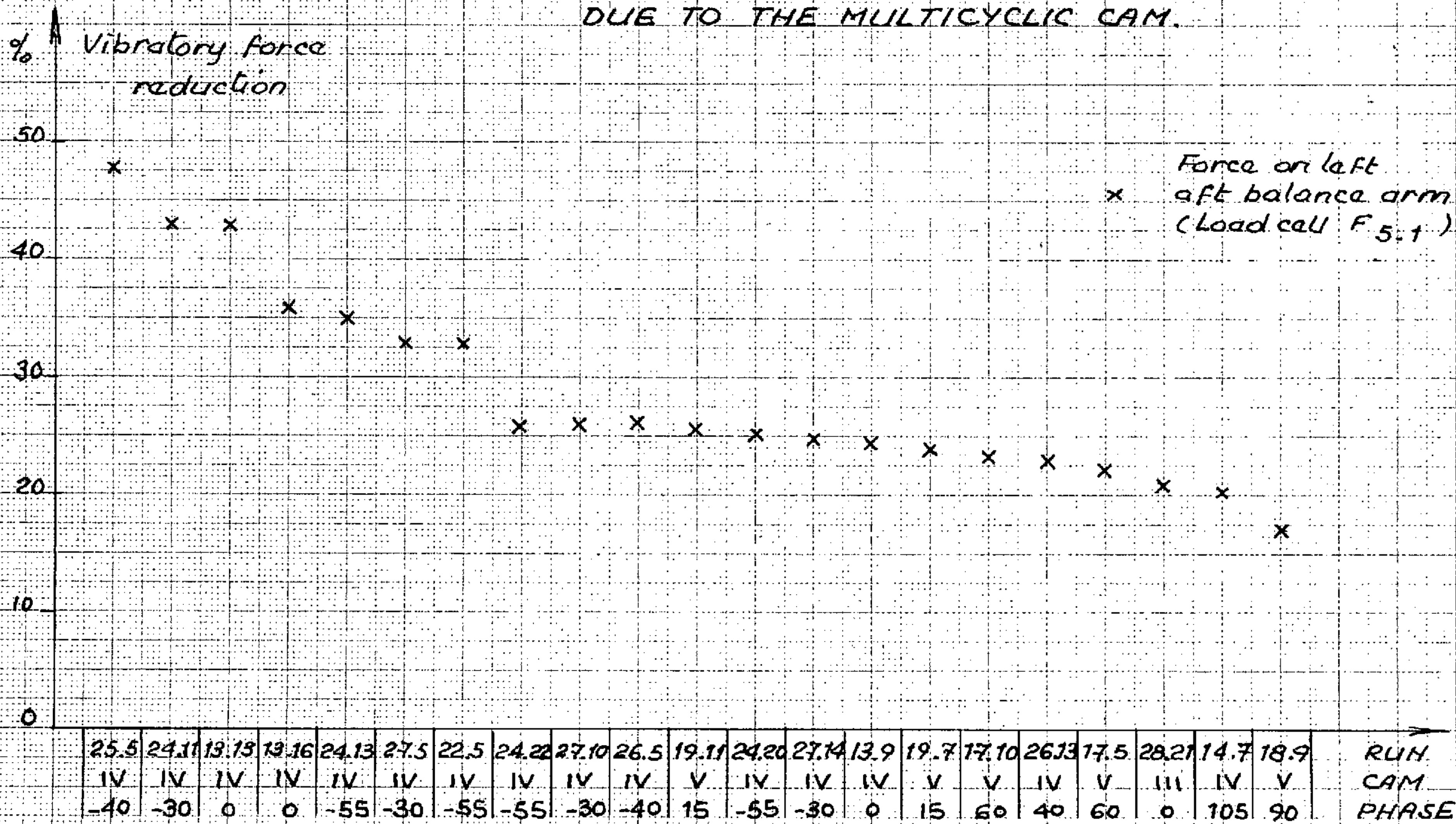


FIG.39

GIRAVIONS DORAND

Doc' DH.2011D.E5

FIG.40

FIG.40 _ AVERAGED PEAK-TO PEAK STRESS VARIATION AS A FUNCTION OF THE MULTICYCLIC CAM PHASE SHIFT.

(Flap bending stress at 0.45 R)

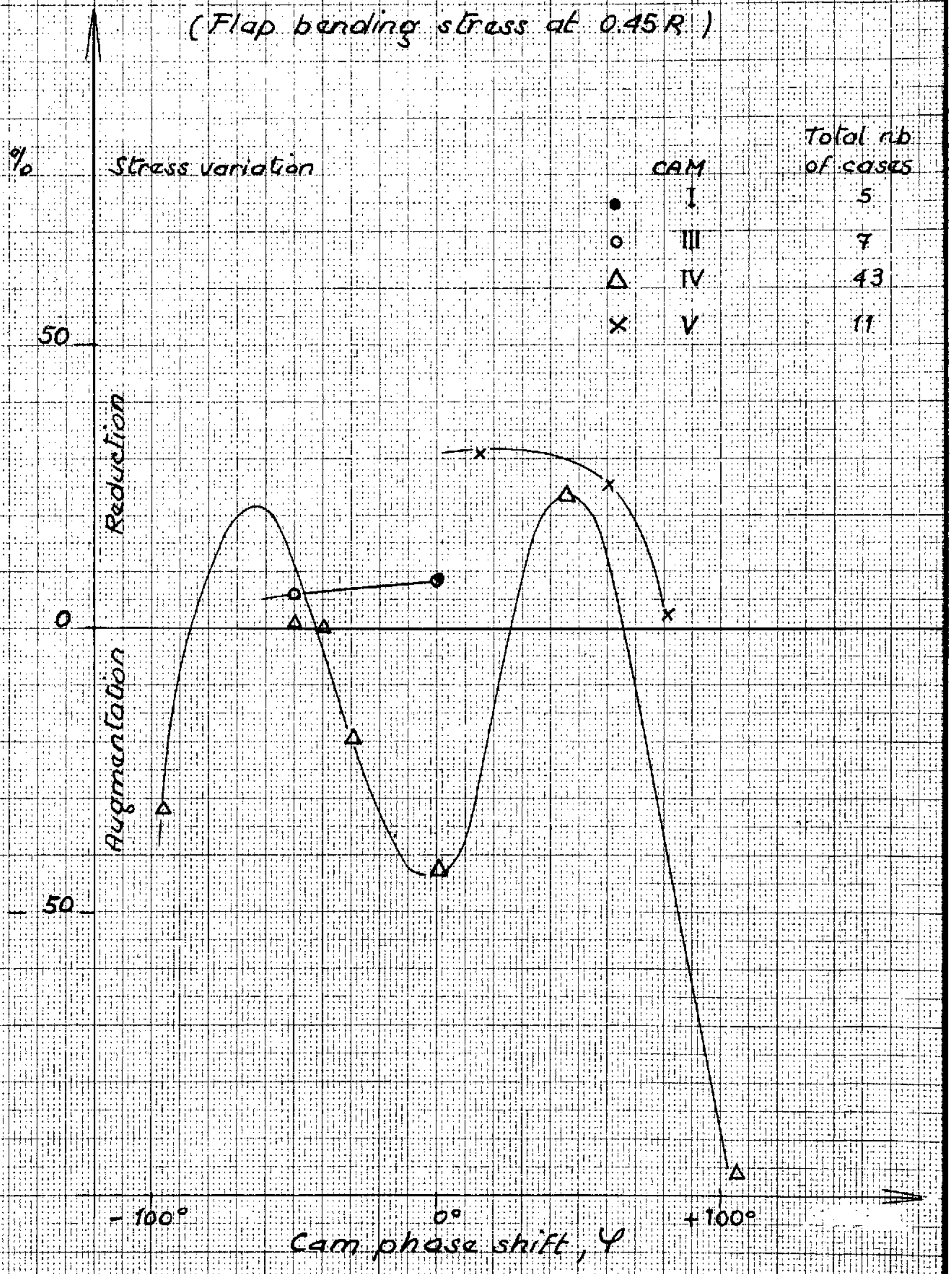


FIG.41

FIG.41_AVERAGED PEAK-TO-PEAK VIBRATORY FORCE VARIATION AS A FUNCTION OF THE MULTICYCLIC CAM PHASE SHIFT.

(Force on F 5.1 _ left aft balance arm)

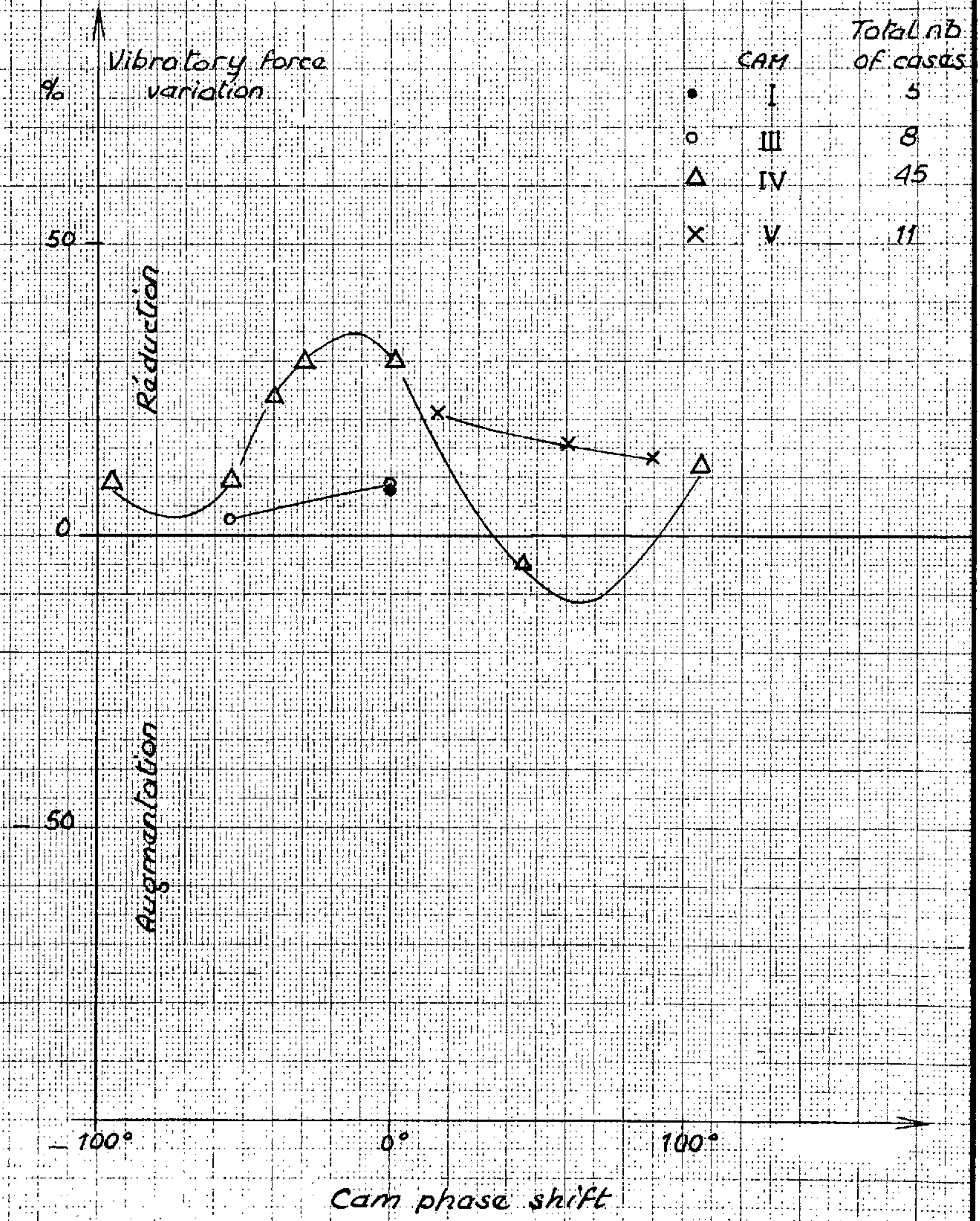
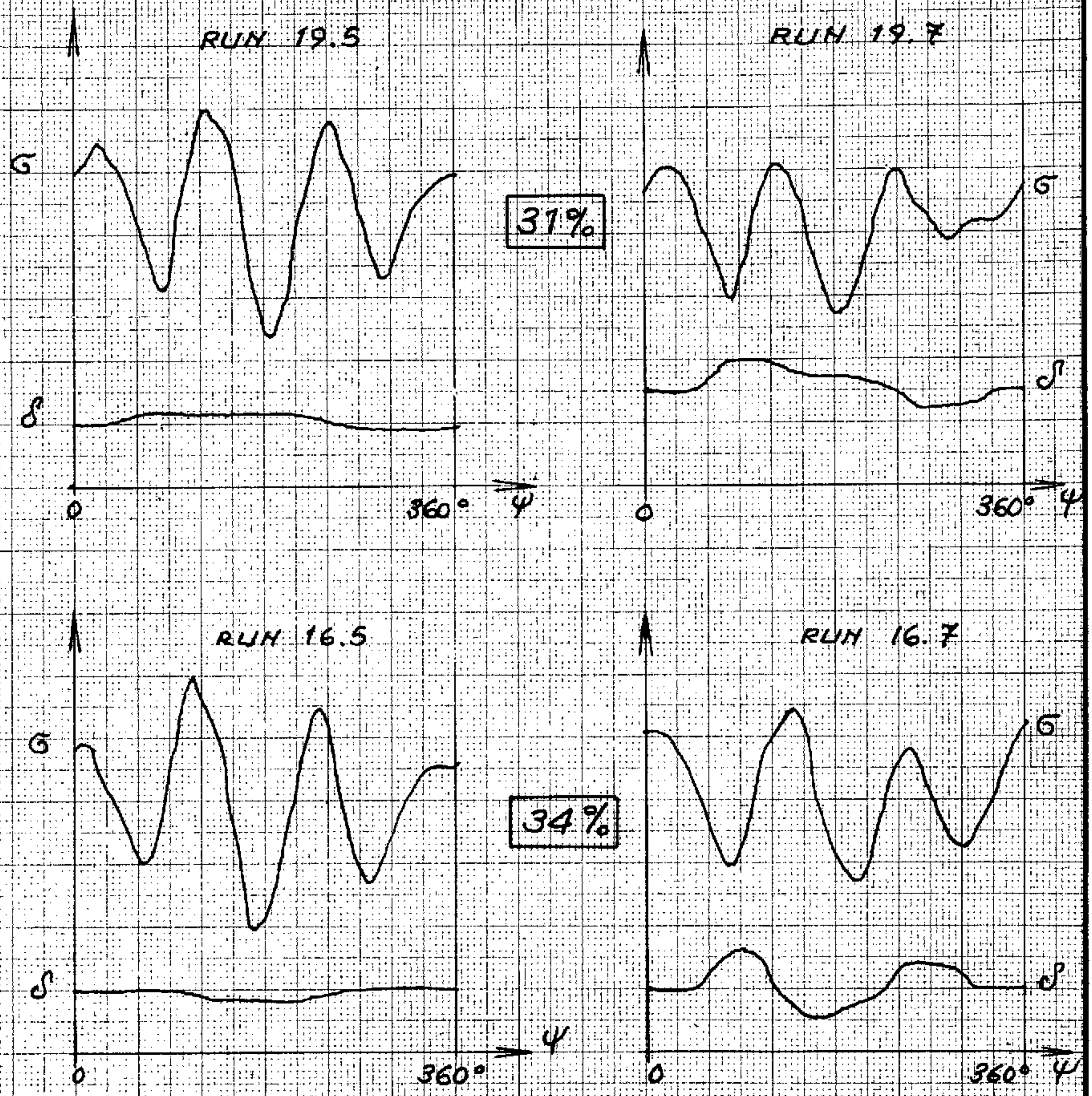


FIG. 42

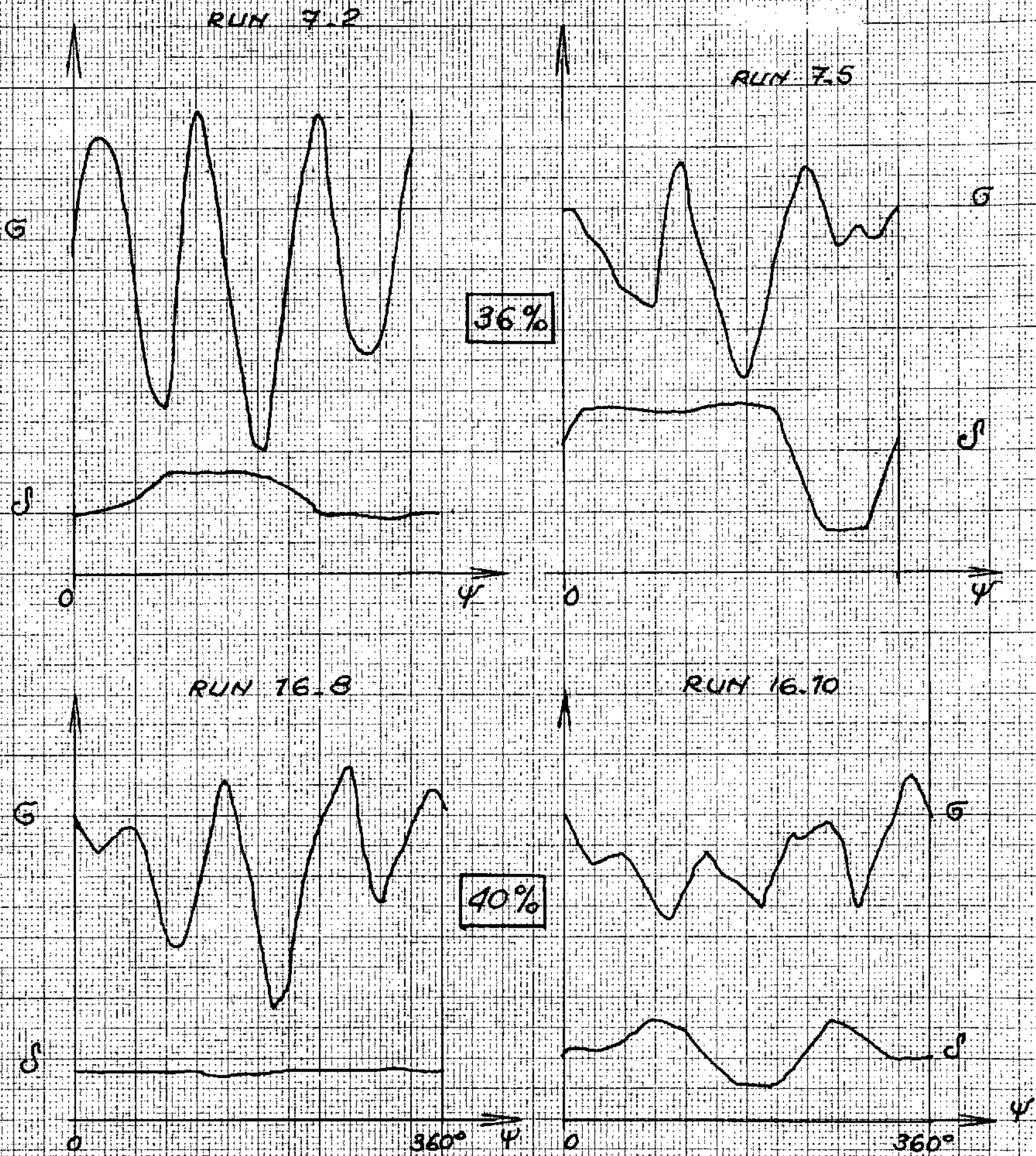


ψ : blade azimuthal angle

σ : Stress signal (scale factor 0.23 hb/mm)

δ : Jet flap deflection signal (Scale factor 1.6 deg/mm)

FIG. 43

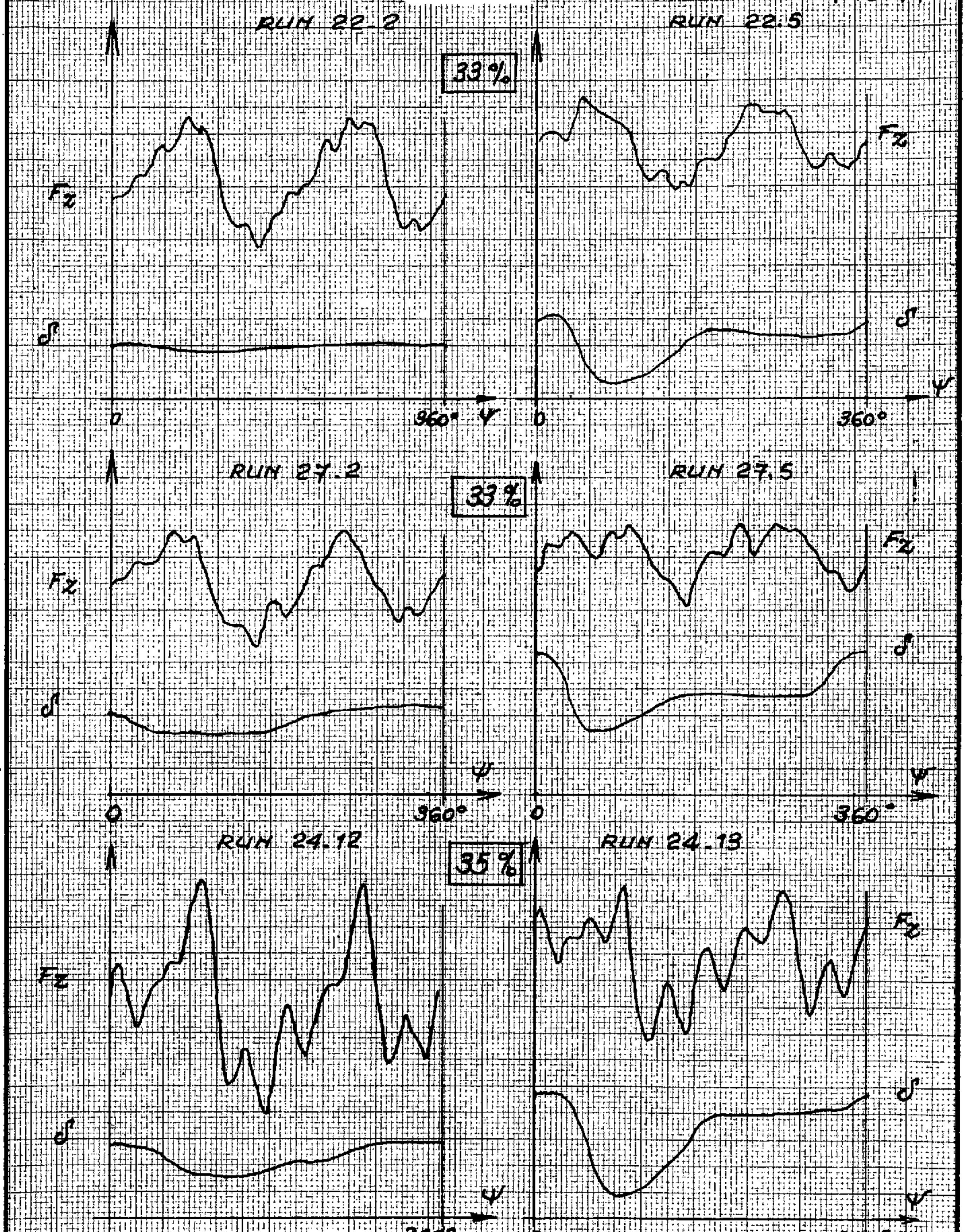


ψ : blade azimuthal angle

σ : Stress signal (Scale factor 0.23 hb /mm)

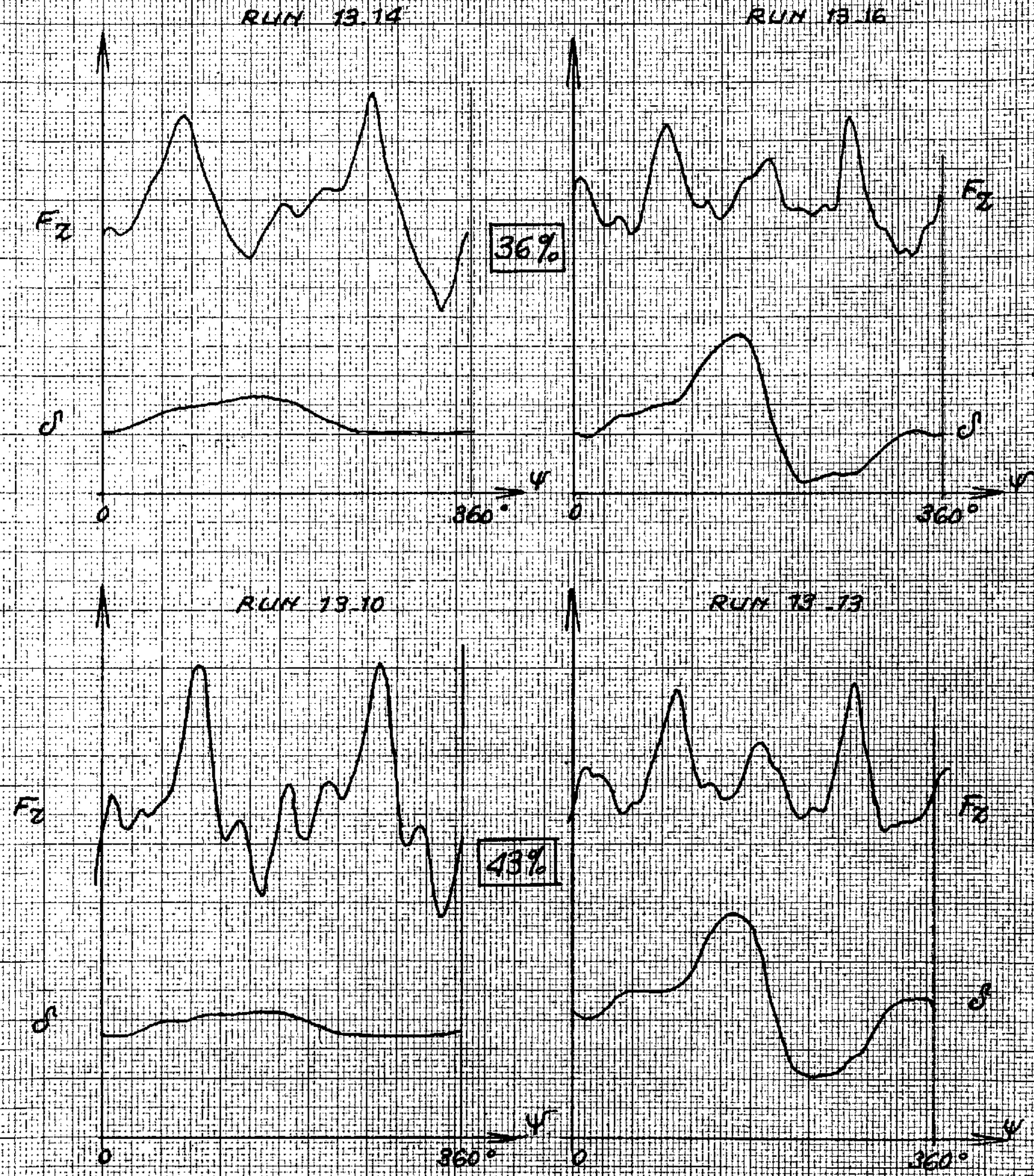
δ : Jet Flap deflection signal (Scale factor 1.6 deg/mm)

FIG. 44



Ψ : Blade azimuthal angle
F_z : Vibratory force signal on load cell 51 (Scale factor 30 daN/mm)
δ : Jet flap deflection signal (Scale factor 1.6 deg/mm

FIG. 45

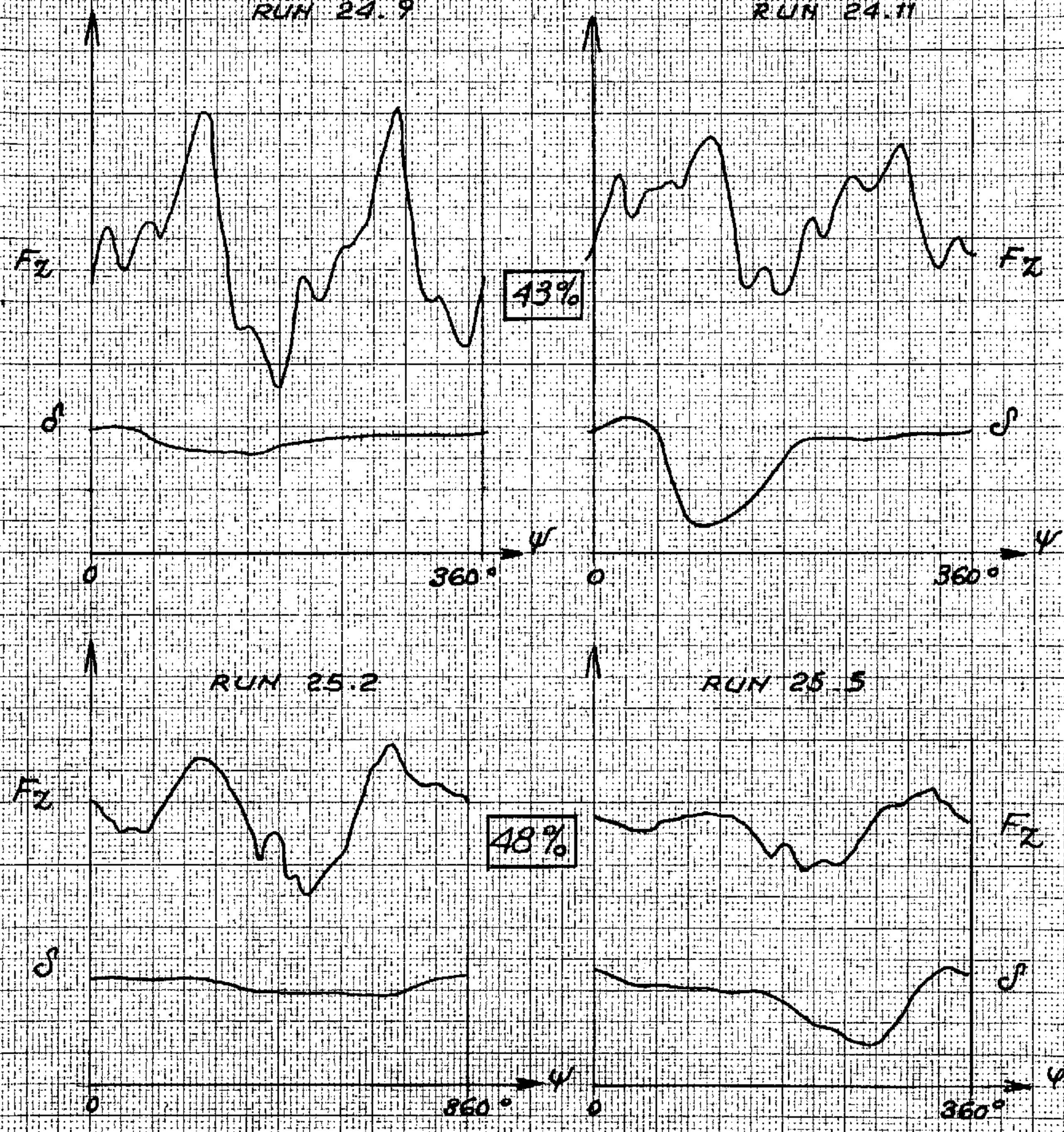


Ψ : Blade azimuthal angle

F_z : Vibratory force signal on load cell 5.1 (Scale factor 30 daN/mm)

δ : Jet Flap deflection signal (Scale factor 1.6 deg/mm)

FIG. 46



ψ : Blade azimuthal angle

Fz : Vibratory force signal on load cell 5.1 (Scale factor 30 daN/mm)

δ : Jet flap deflection signal (Scale factor 1.6 deg/mm)

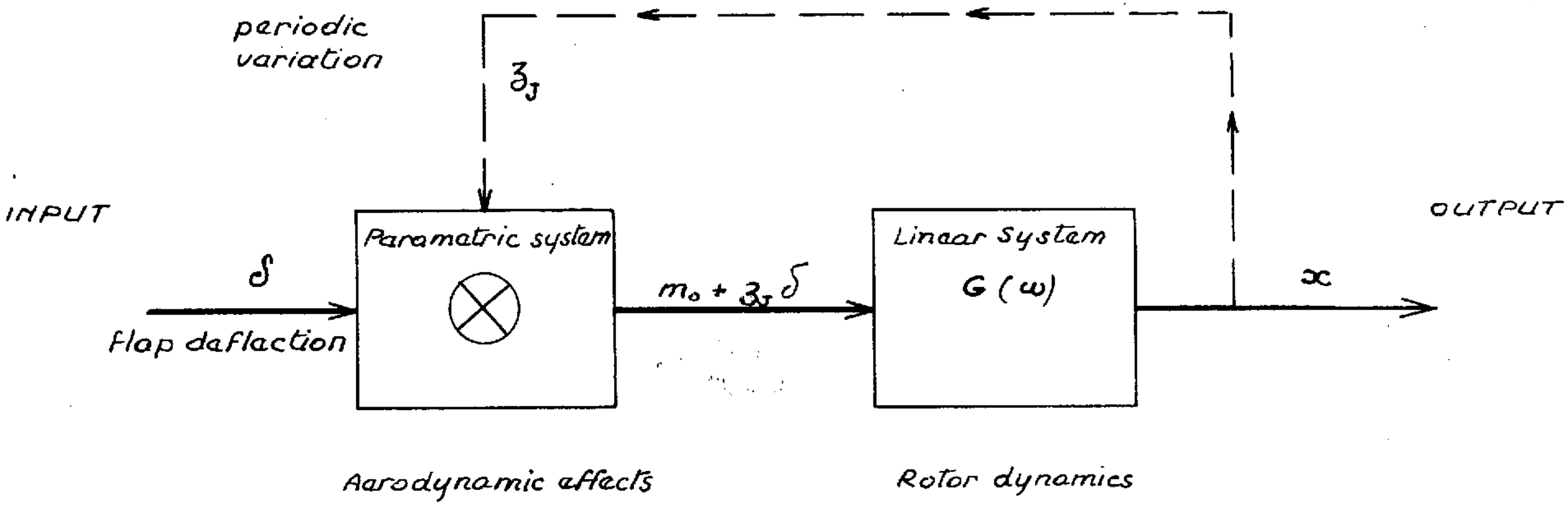


FIG.47. SIMPLIFIED MODEL OF THE ROTOR

FOR MULTICYCLIC EFFECTS EVALUATION

FIG.47

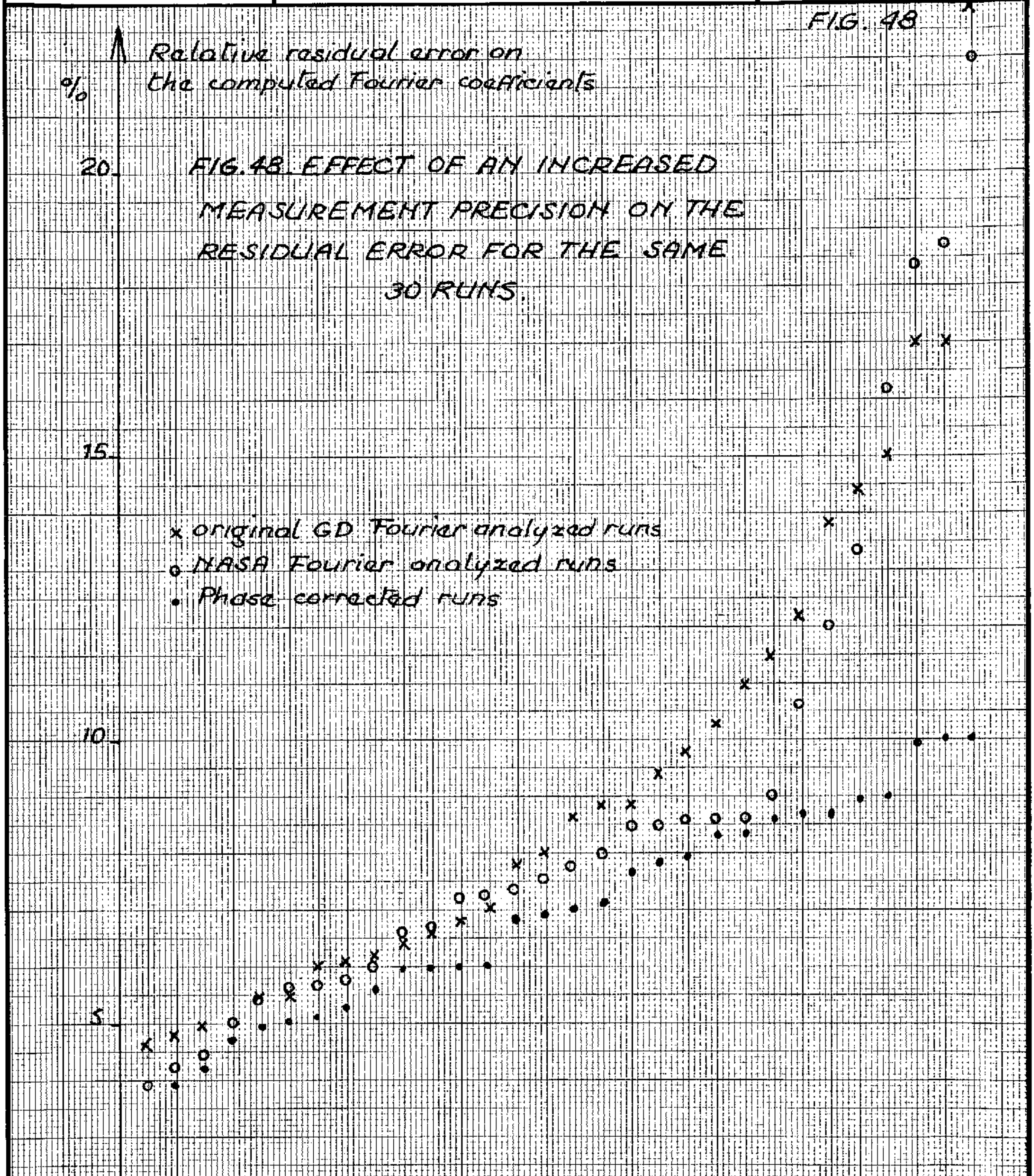


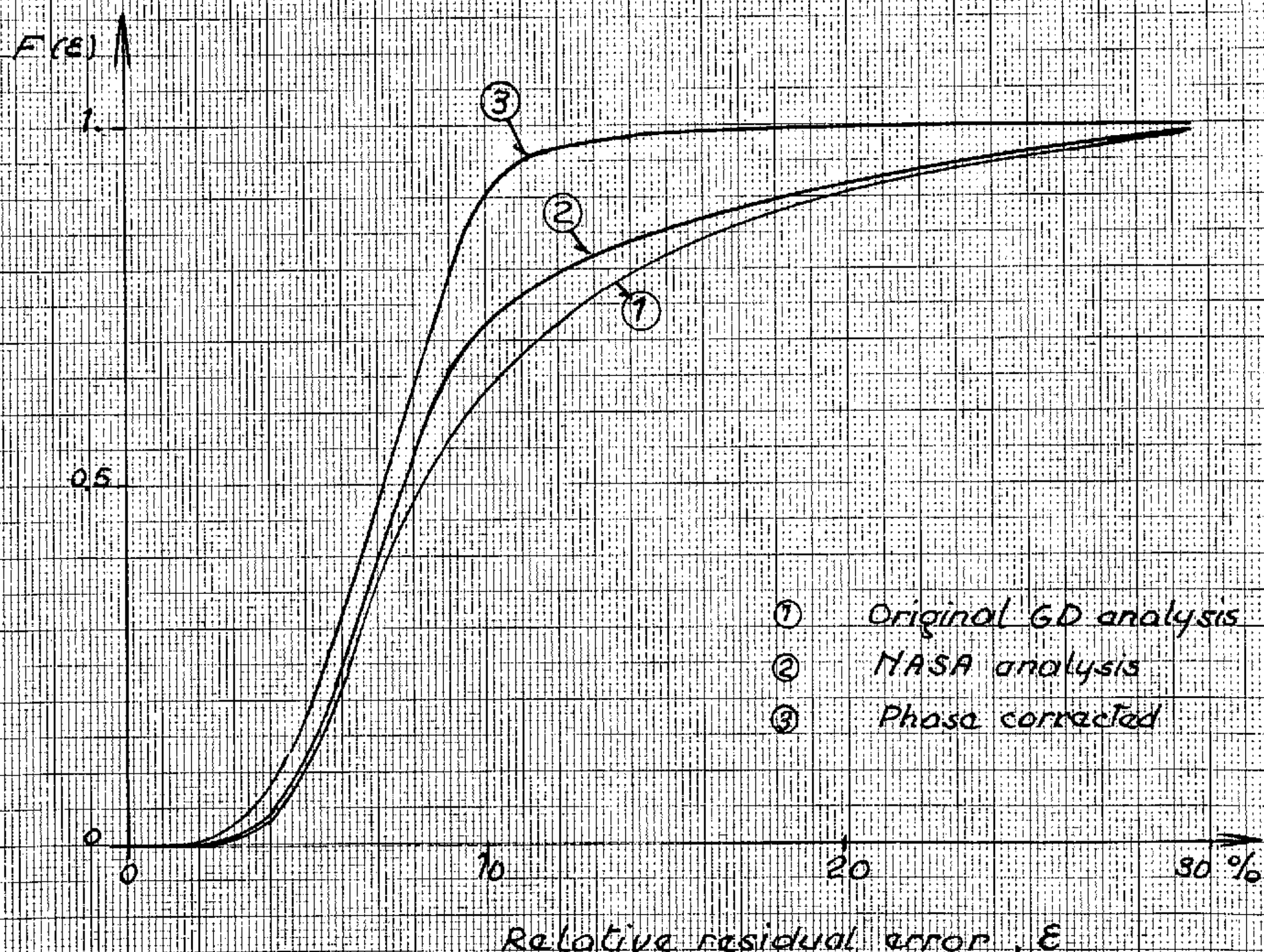
FIG. 48 EFFECT OF AN INCREASED MEASUREMENT PRECISION ON THE RESIDUAL ERROR FOR THE SAME 30 RUNS.

RUN # Phase adjusted	RUN # NASA analysed	RUN # GD analysed
12.10	12.12	9.04
12.12	12.10	12.13
12.13	12.13	13.17
16.02	13.17	9.3
16.11	19.11	12.10
14.12	14.12	14.12
14.13	14.13	12.12
13.17	16.12	13.16
9.03	9.3	14.11
9.04	12.11	18.11
18.10	13.14	19.11
18.12	13.16	14.13
13.16	19.8	16.12
12.11	18.11	13.15
9.07	14.11	13.14
19.09	9.4	19.9
19.08	16.13	9.7
14.11	16.9	16.13
9.10	16.10	19.8
9.05	9.9	9.10
9.06	13.15	12.11
16.09	9.10	18.10
13.14	9.7	16.10
19.10	19.9	9.5
13.15	9.6	9.6
19.11	18.10	14.10
14.12	14.10	16.9
14.13	18.12	18.12
16.10	19.10	19.10
16.13	16.8	16.8

FIG 49

FIG.49 _ EVOLUTION OF THE REPARTITION FUNCTION OF THE RESIDUAL ERROR ON COMPUTED FOURIER COEFFICIENTS WITH THE REFINEMENT OF THE MEASUREMENTS

$$F(\varepsilon) = \frac{\text{number of runs whose residual error is less than } \varepsilon}{\text{total number of runs}}$$



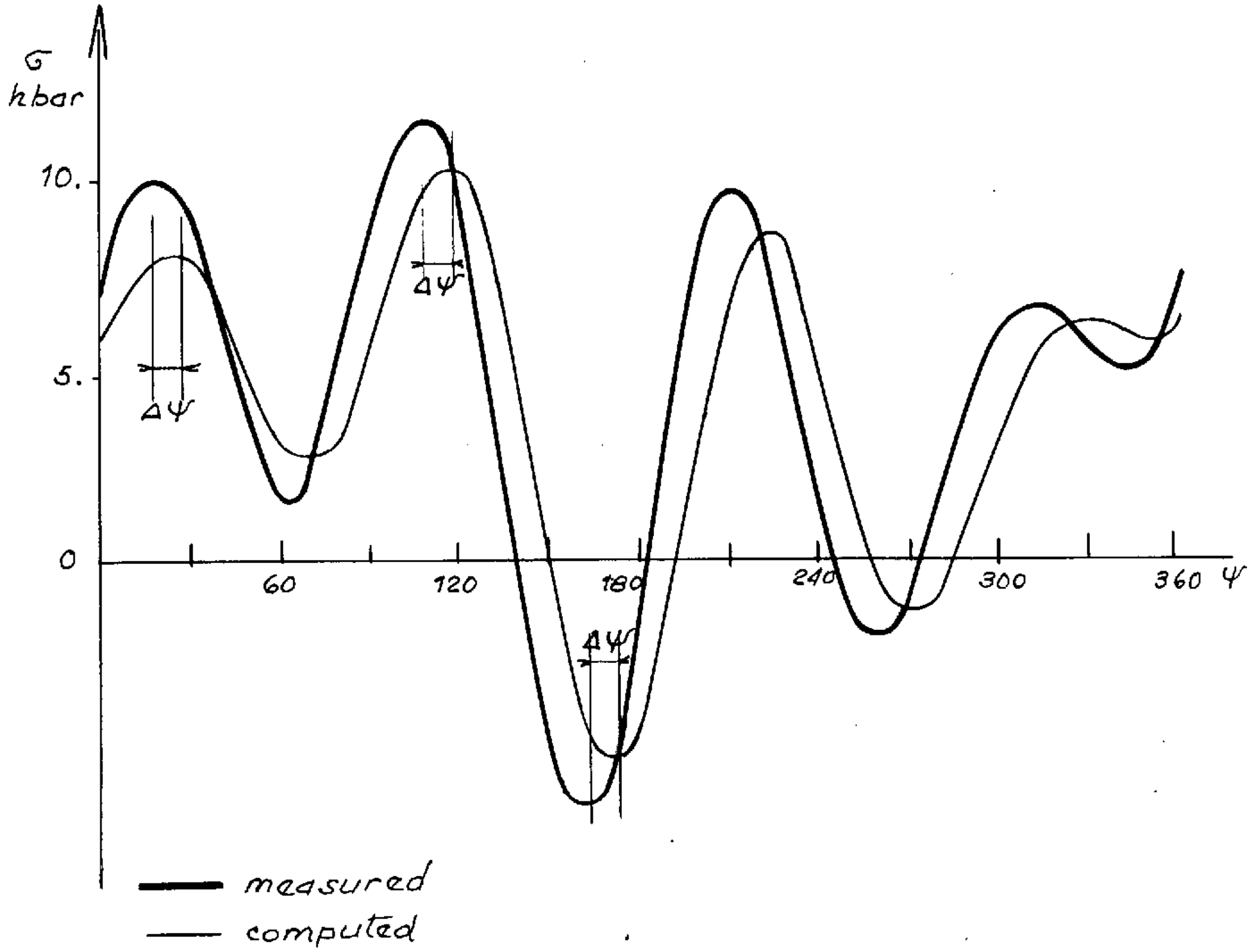


FIG. 50 - COMPARISON BETWEEN MEASURED AND COMPUTED STRESS FOR RUN 16.08 SHOWING THE PHASE SHIFT.

FIG.51

FIG.51 - INFLUENCE OF JET FLAP DEFLECTION HARMONICS ON FLAP BENDING STRESS HARMONIC AMPLITUDE

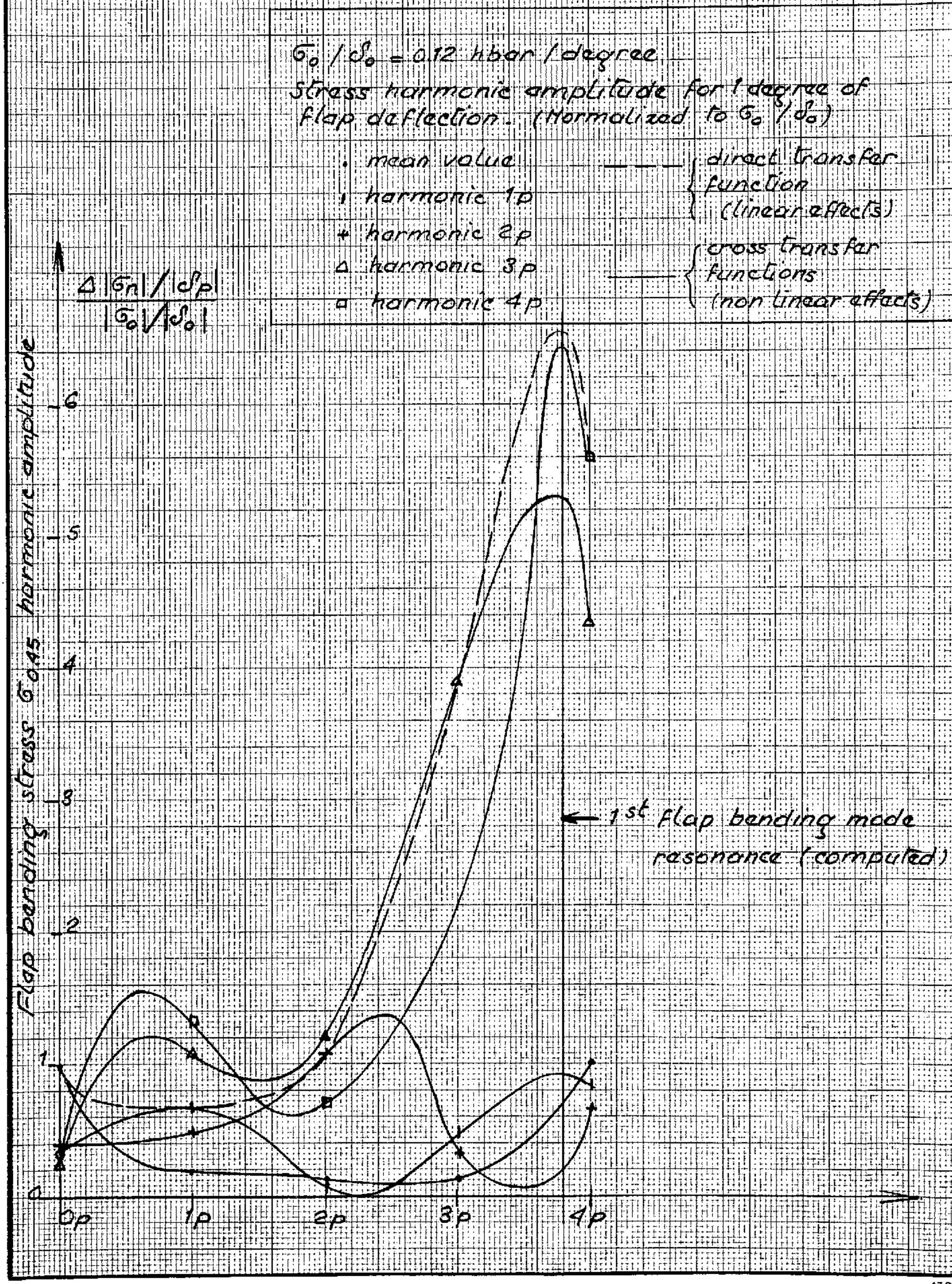
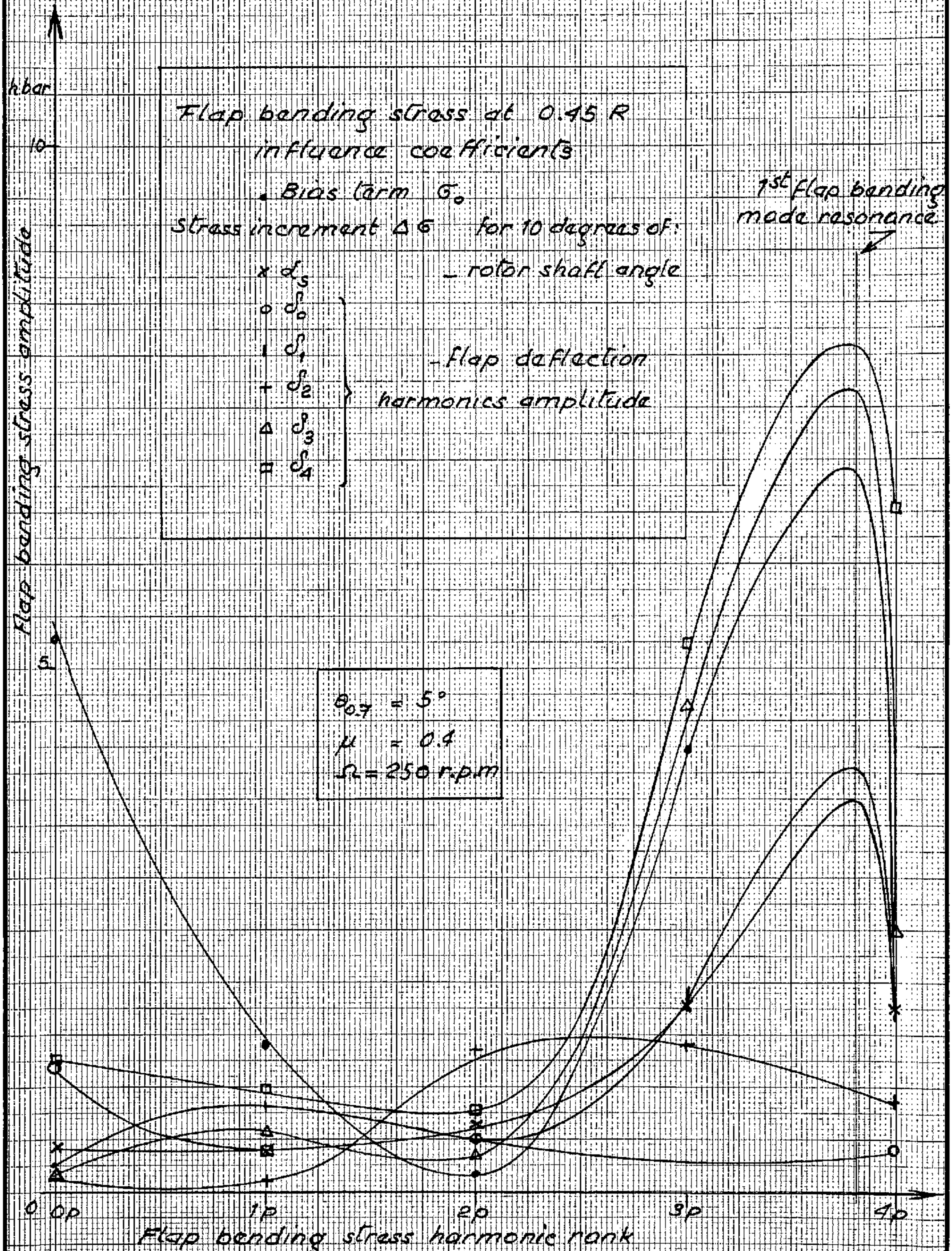


FIG. 52 . FLAP BENDING STRESS HARMONICS

SENSISIVITY TO ROTOR SHAFT ANGLE AND FLAP DEFLECTION.



GIRAVIONS DORAND	FIG. 53_ IDEAL AND OPTIMAL "B" CAMS FOR STRESSES. (FIXED STICK CONDITIONS)	Doc' DH.2011.D.E5 Page 138

FIG. 53

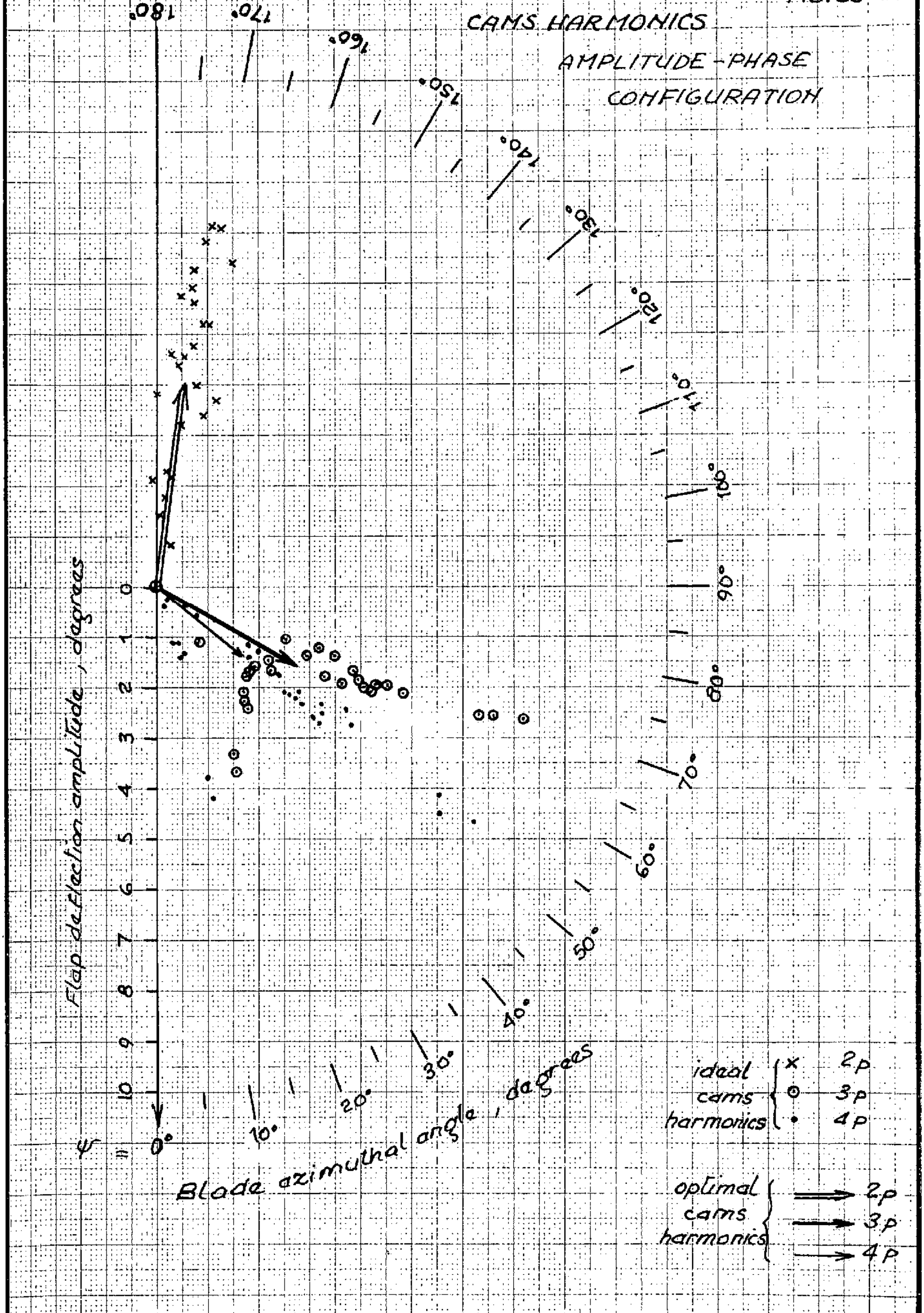
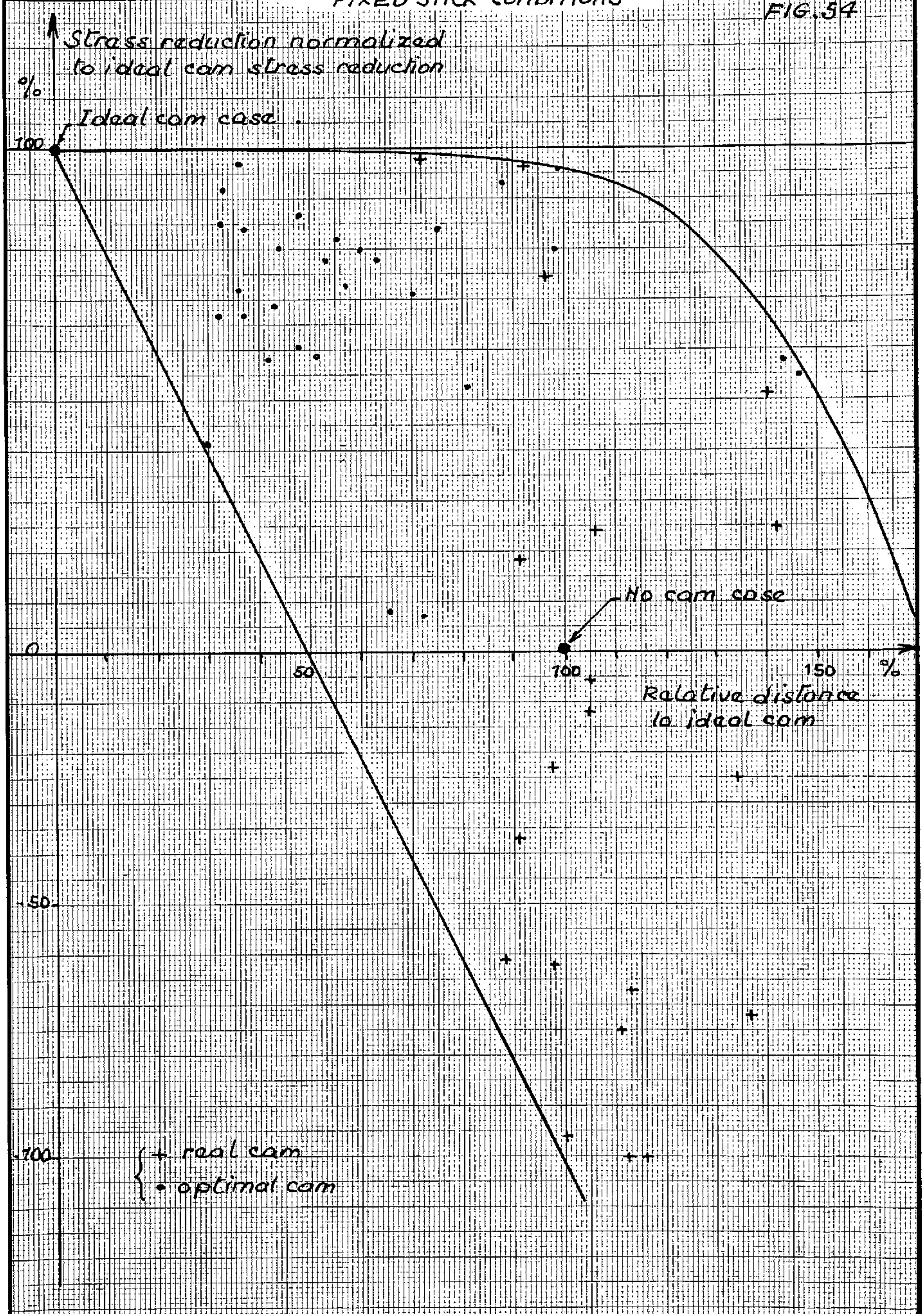


FIG. 54


Stress reduction normalized to ideal cam stress reduction
%
Ideal cam case
100
0
-50
-100
No cam case
50
100
150
%
Relative distance to ideal cam
+ real cam
• optimal cam

GIRAVIONS DORAND	FIG. 55 - IDEAL AND OPTIMAL "B" CAMS FOR STRESSES. FIXED FLIGHT CONDITIONS.	Doc DH. 2011 D. E5
		Page 140

FIG. 55

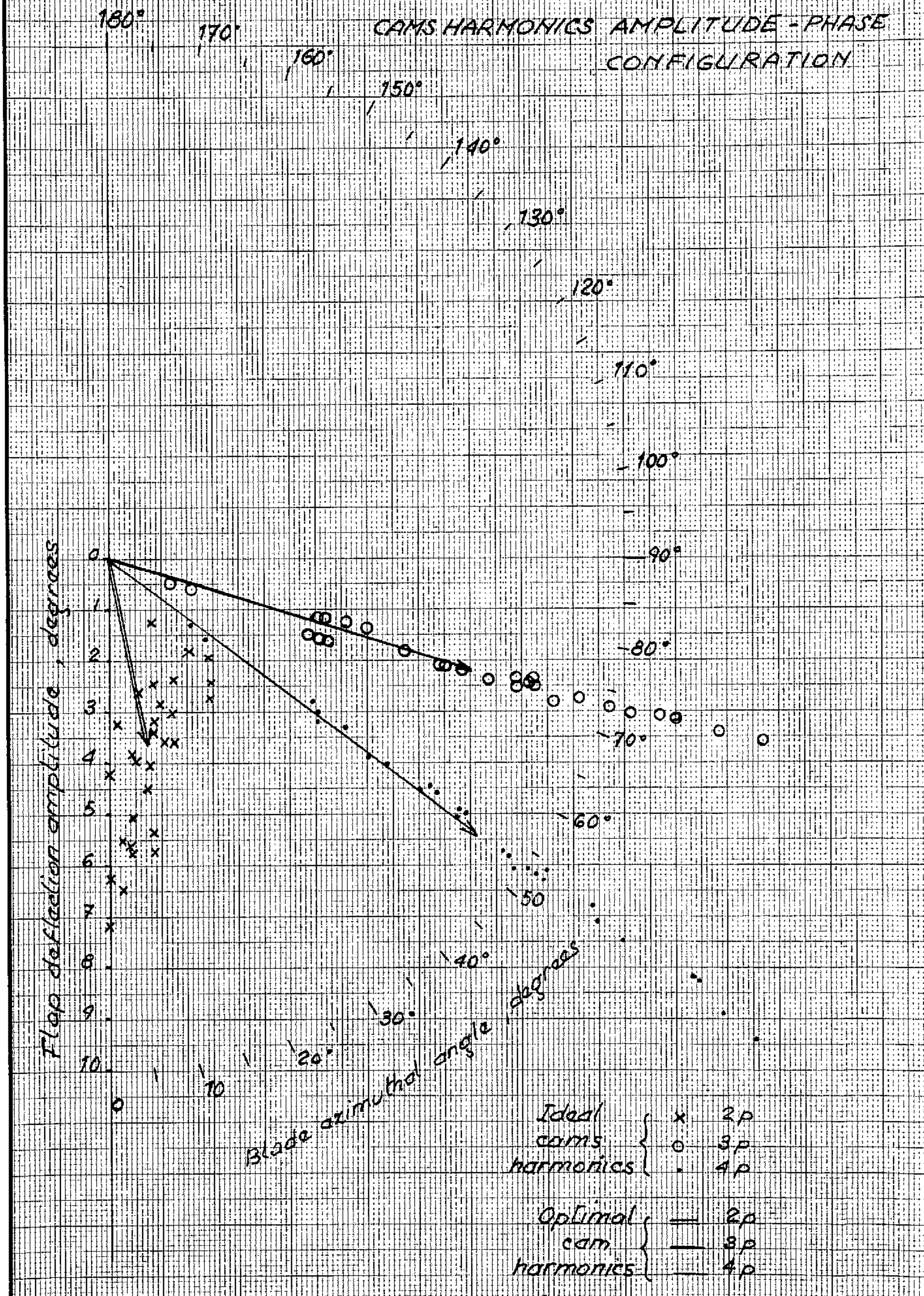


FIG.56 _ COMPARISON BETWEEN CAM IV, AND OPTICAL CAM FOR FIXED FLIGHT CONDITIONS

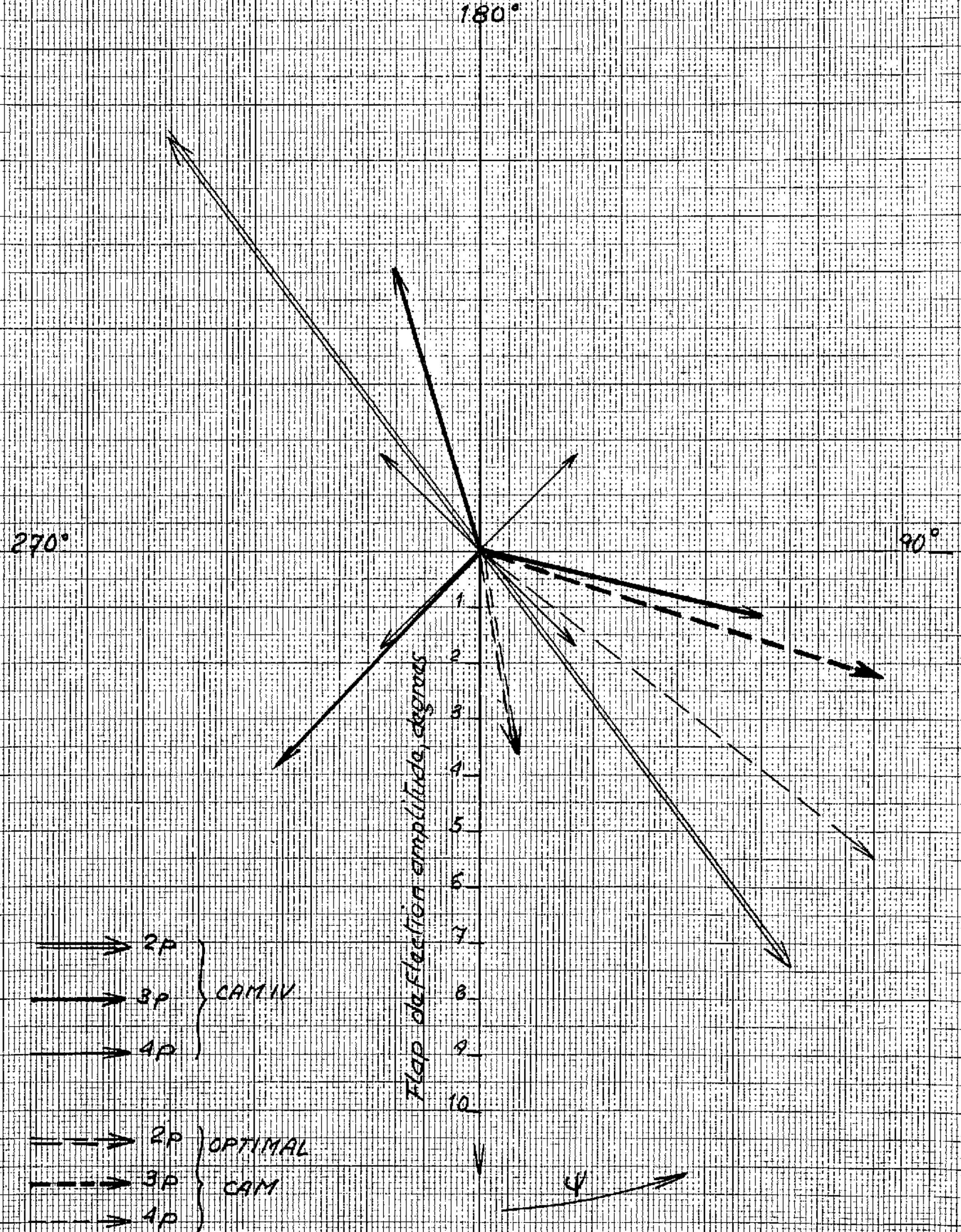
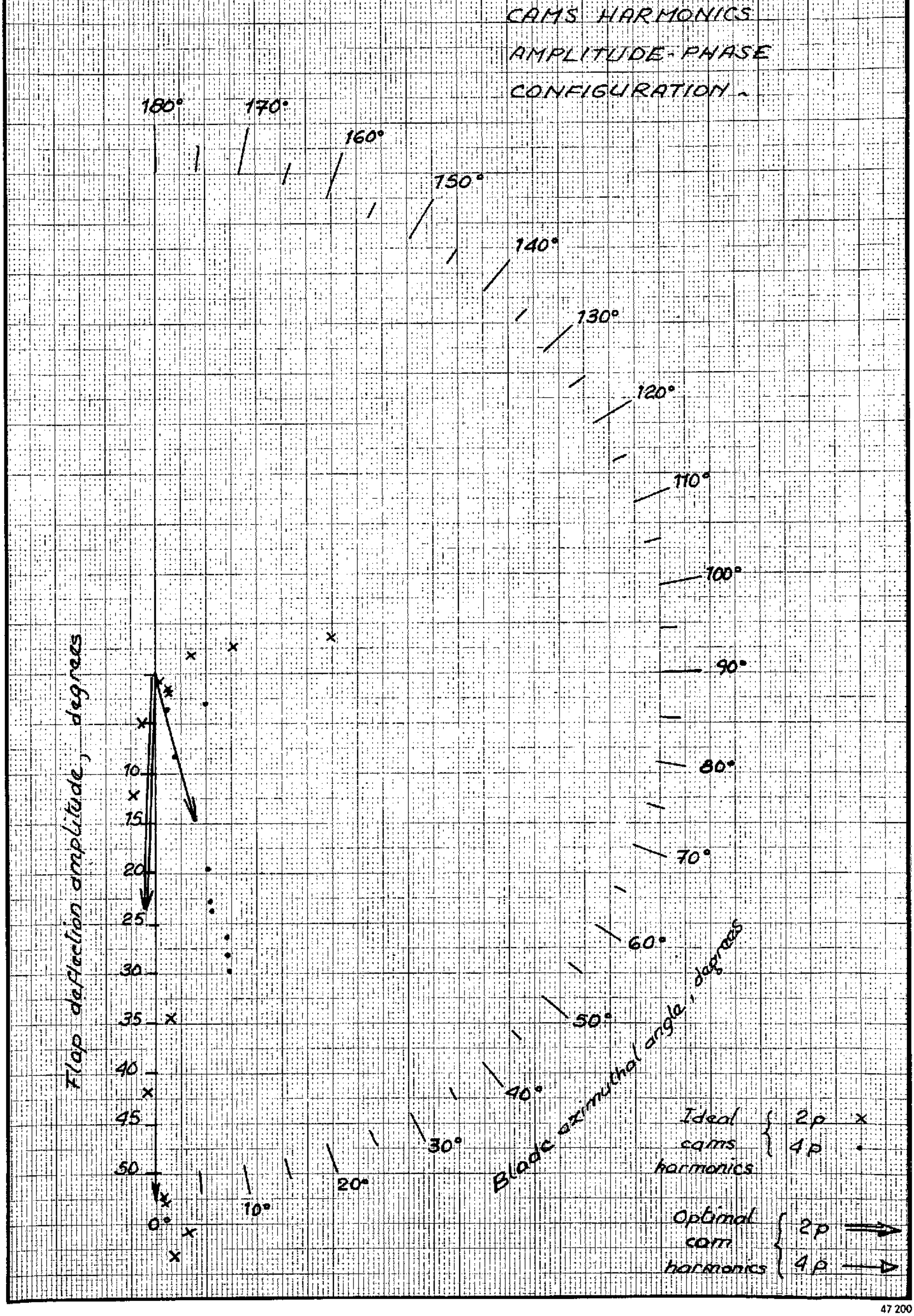


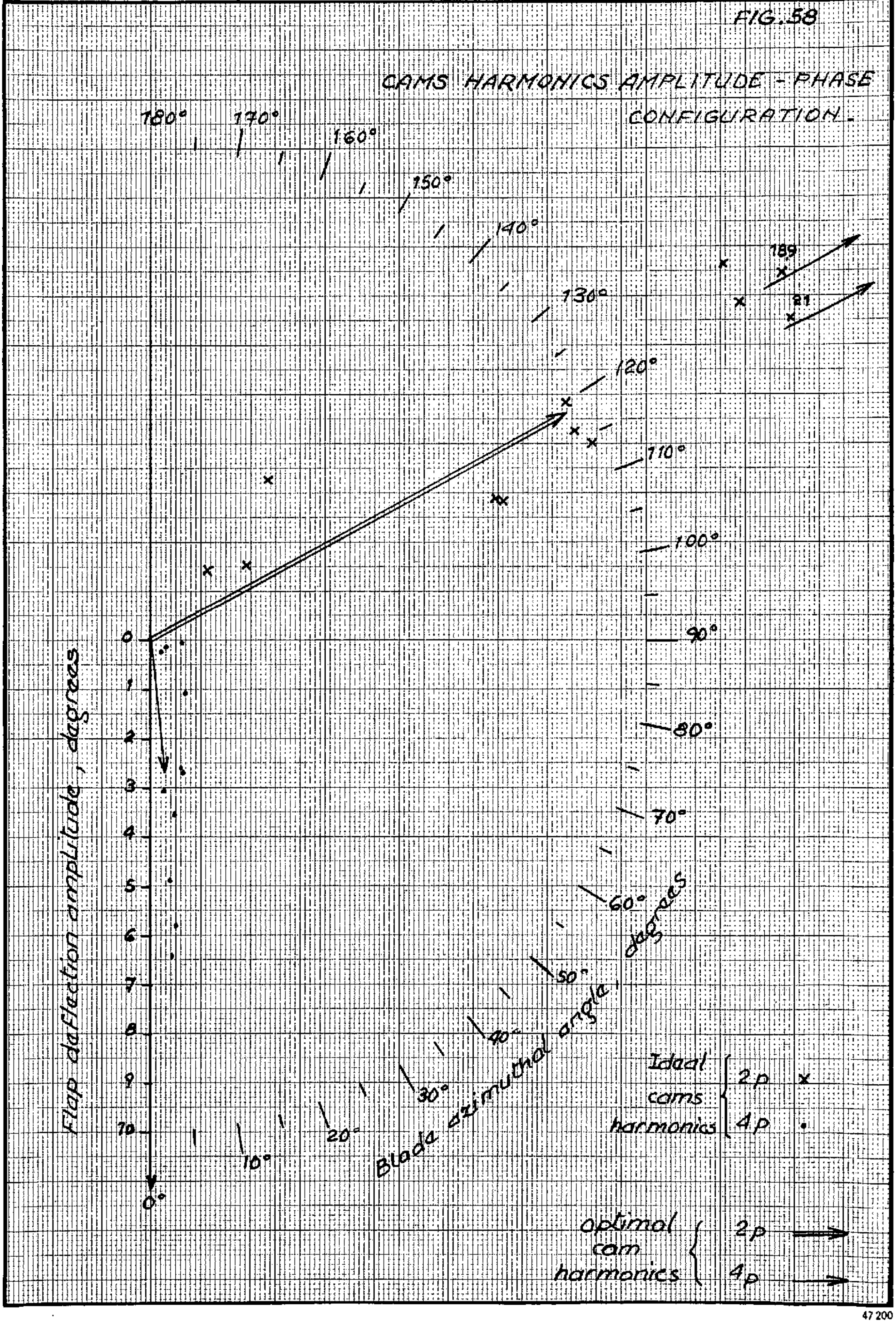
FIG 57


CAMS HARMONICS
AMPLITUDE-PHASE
CONFIGURATION
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
60°
50°
40°
30°
20°
10°
0°
Flap deflection amplitude, degrees
10
15
20
25
30
35
40
45
50
Blade azimuthal angle, degrees
Ideal cams harmonics
2p
4p
Optimal cam harmonics
2p
4p

GIRAVIONS DORAND

FIG.58. IDEAL AND OPTIMAL "B" CAMS FOR VIBRATORY FORCES FIXED FLIGHT CONDITIONS

FIG.58



GIRAVIONS DORAND	FIG. 59. COMPARISON BETWEEN OPTIMAL CAMS FOR SIMULATIONS (C_T) AND FOR VIBRATORY FORCES.	Doc' DH.2011D.E5
		Page 144

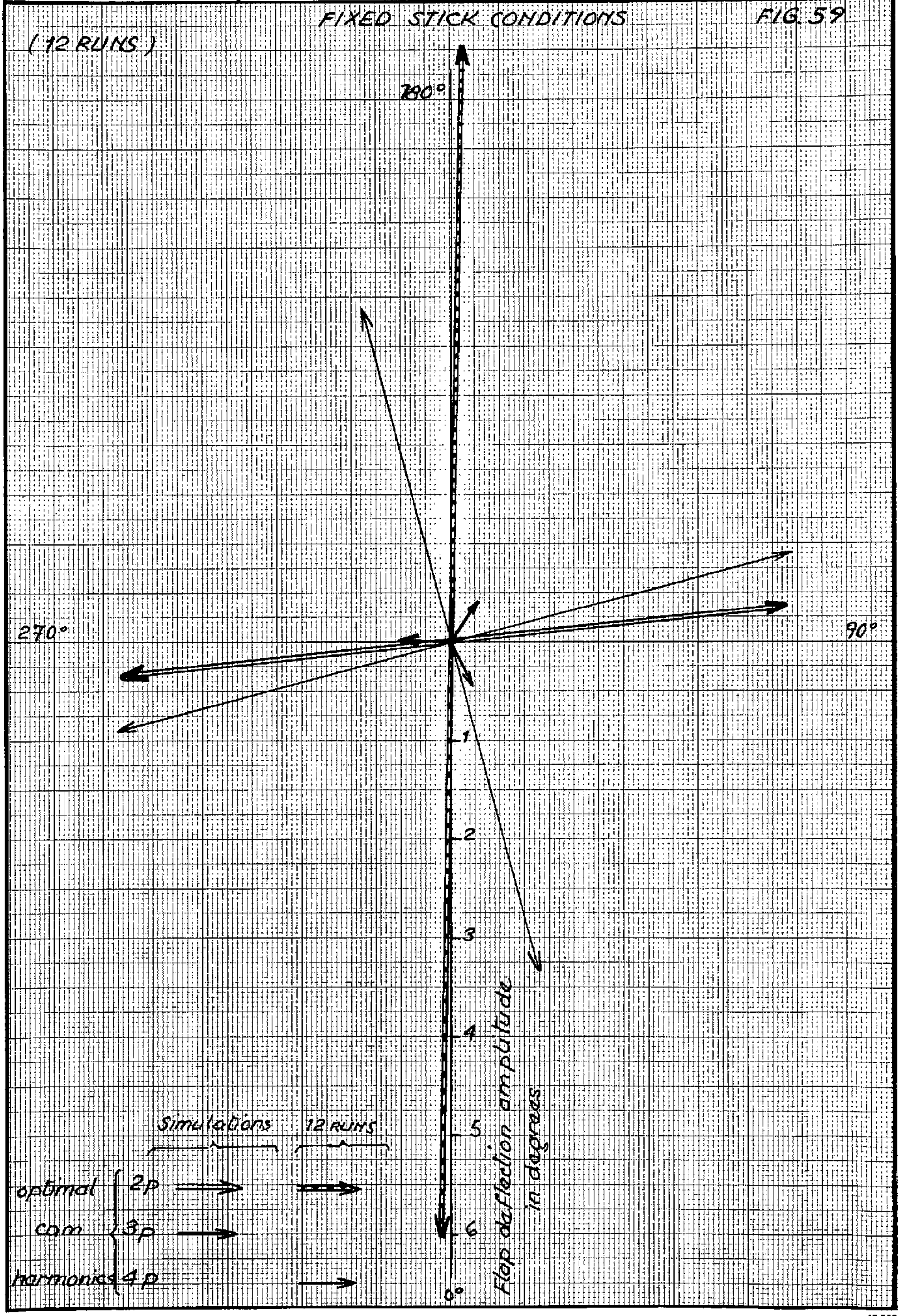


FIG.60 - INFLUENCE OF FLAP DEFLECTION HARMONICS ON VIBRATORY FORCE HARMONICS.

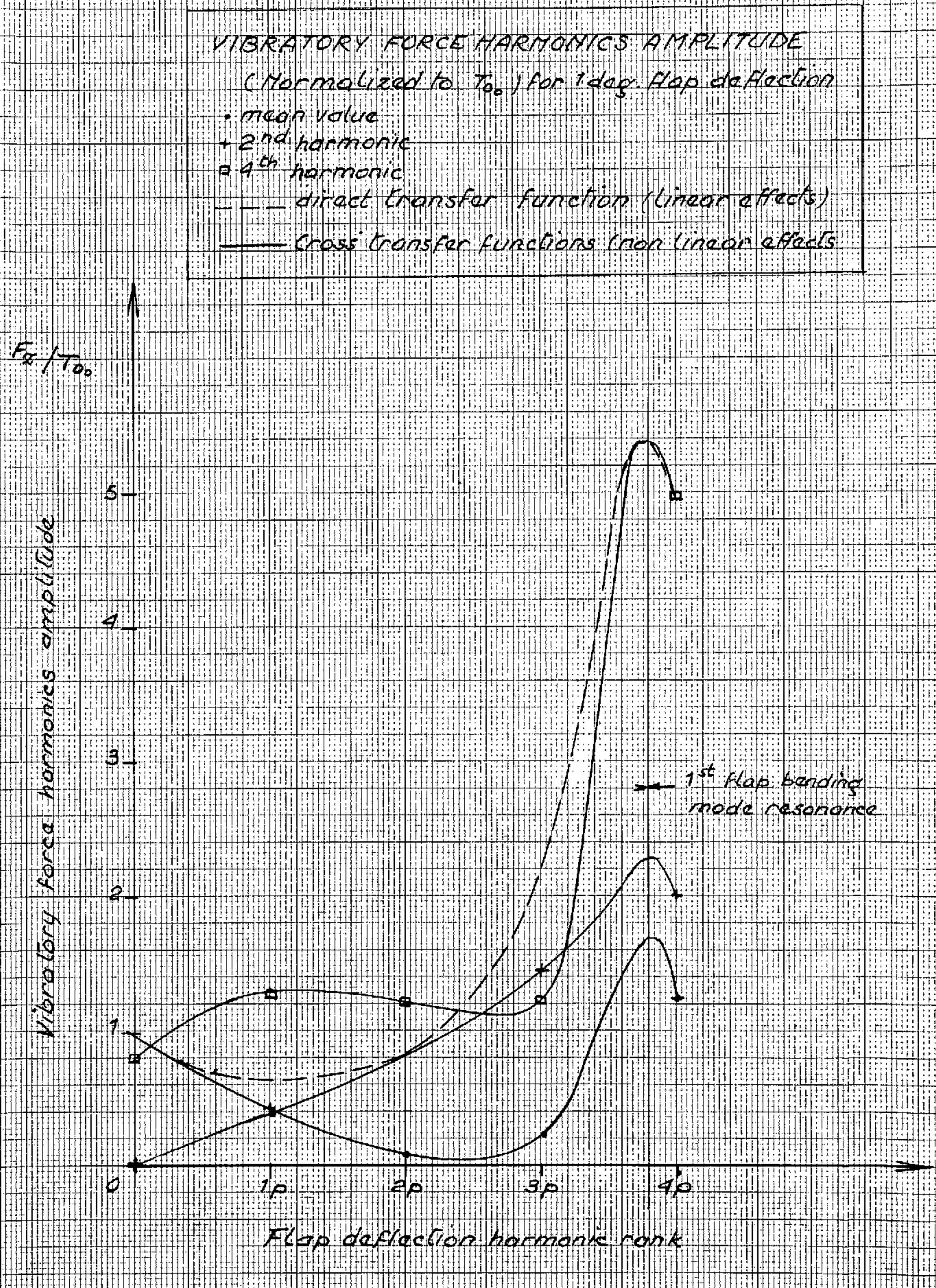


FIG.61

FIG.61. VIBRATORY FORCE HARMONICS SENSITIVITY, TO ROTOR SHAFT ANGLE AND FLAP DEFLECTION

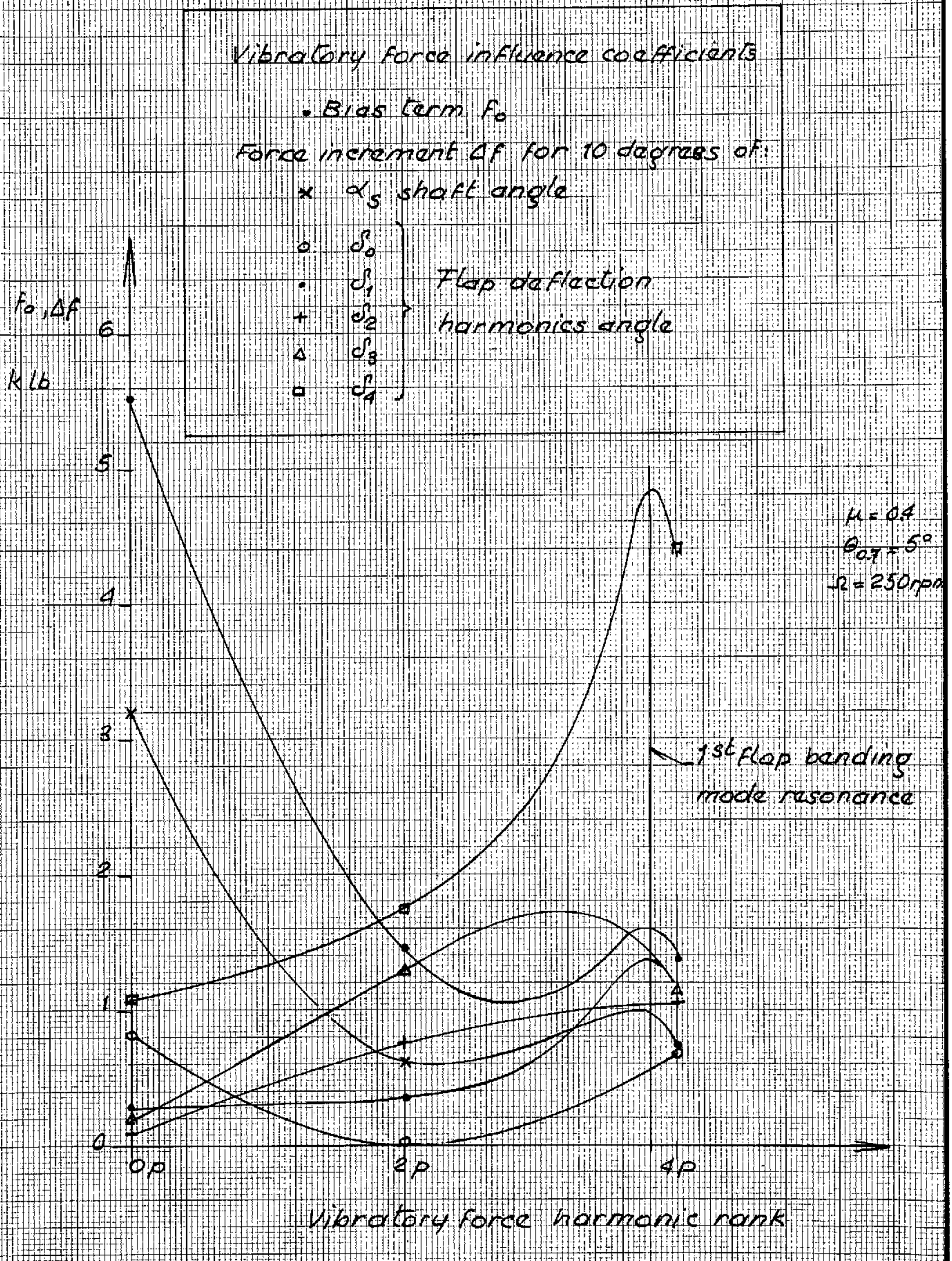
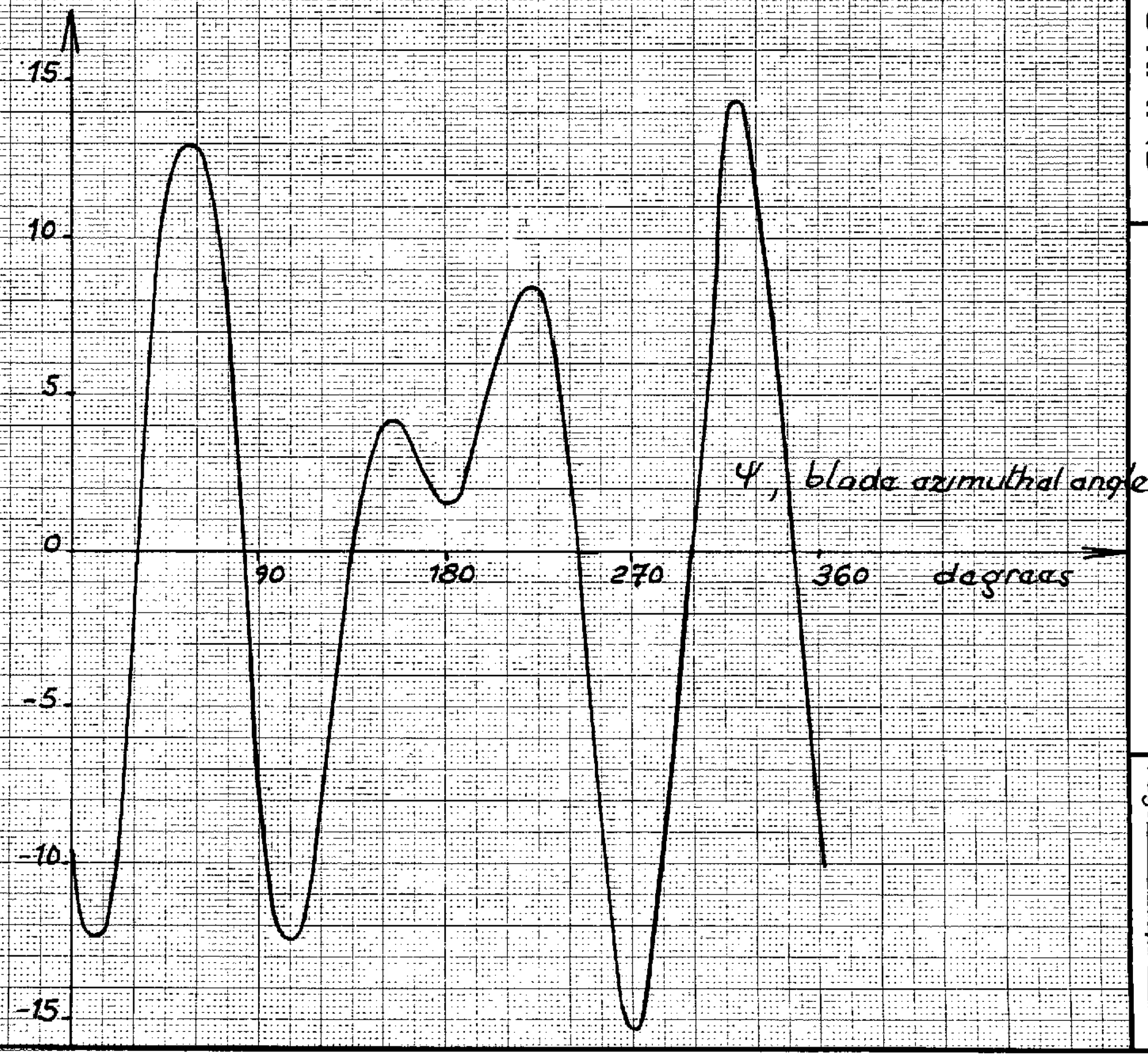


FIG.62. OPTIMAL CAM FLAP DEFLECTION FOR STRESS REDUCTION FIXED FLIGHT CONDITIONS



Fourier coefficients for the optimal cam, in degrees.

	Fourier coefficients (deg)		
	2p	3p	4p
Cosine	3,4	-5,7	-7.5
sine	1.4	-4.5	-4.8

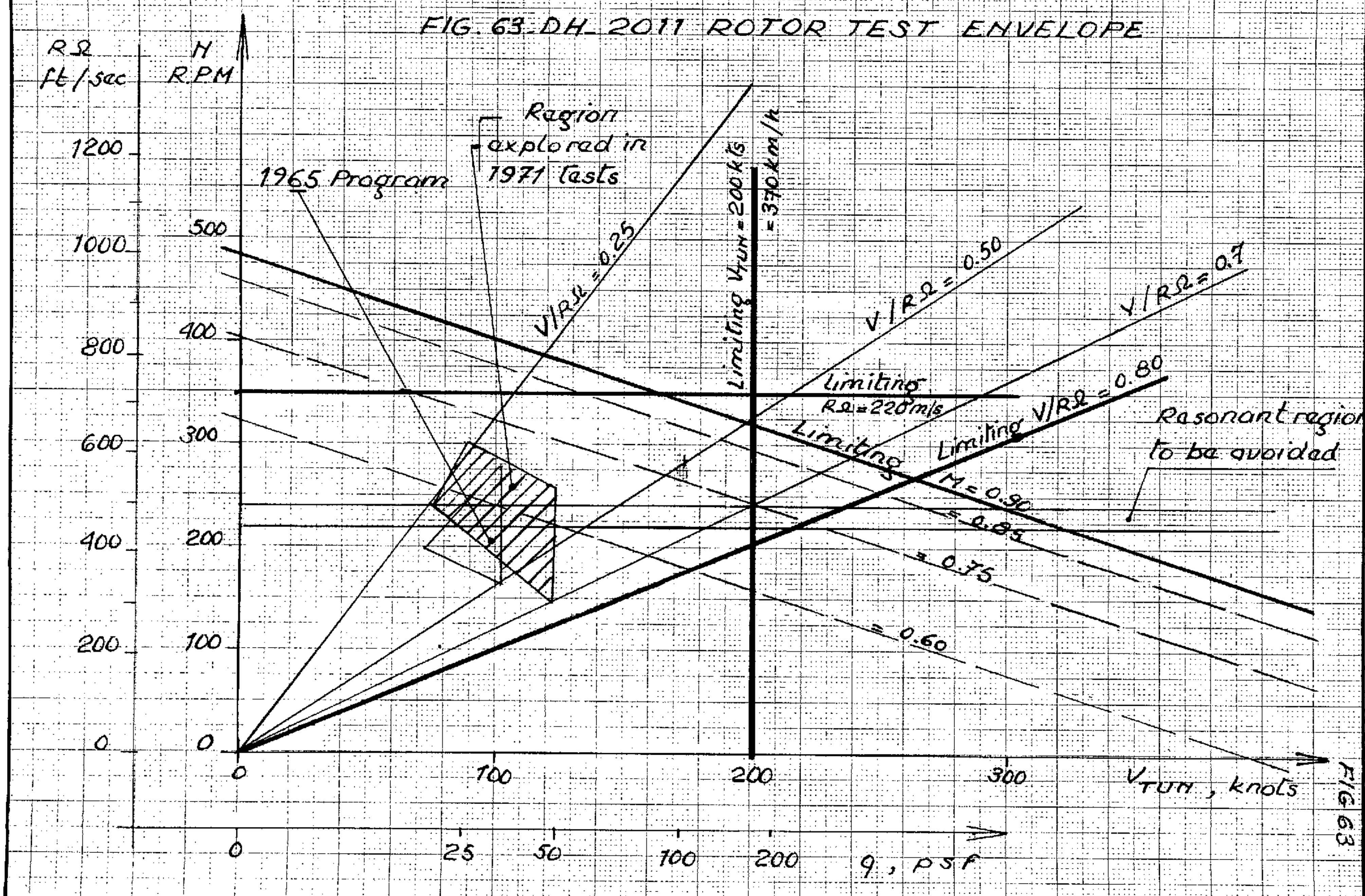
GIRAVIONS DORAND

Doc' DH.2011D.E5

Page 147

47 200

FIG. 63. DH 2011 ROTOR TEST ENVELOPE



GIRAVIONS DORAND

Page 148

Doc' DH 2011. D. E5

FIG 63

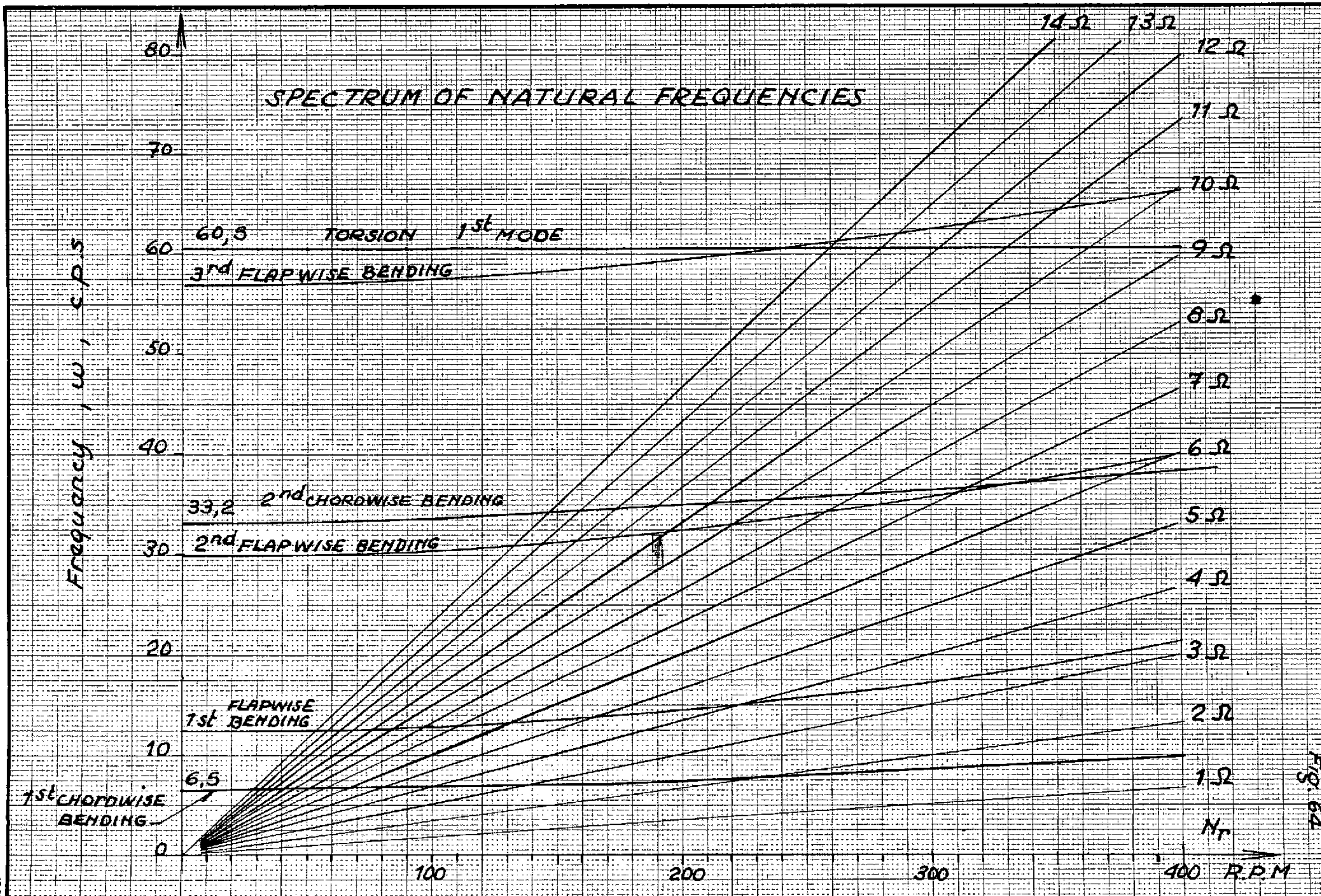


Fig. 64

GIRAVIONS DORAND

Page 149

Doc' DH.201 D. E.5